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**DWIGHT H. GREEN, Governor**



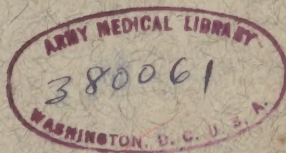
**HEALTH AND SAFETY ACT**  
**and the**  
**HEALTH AND SAFETY RULES**

**of the**

**STATE OF ILLINOIS**  
**in force September 1, 1944**

**INDUSTRIAL COMMISSION OF ILLINOIS**

**Alfred J. Borah, Chairman**



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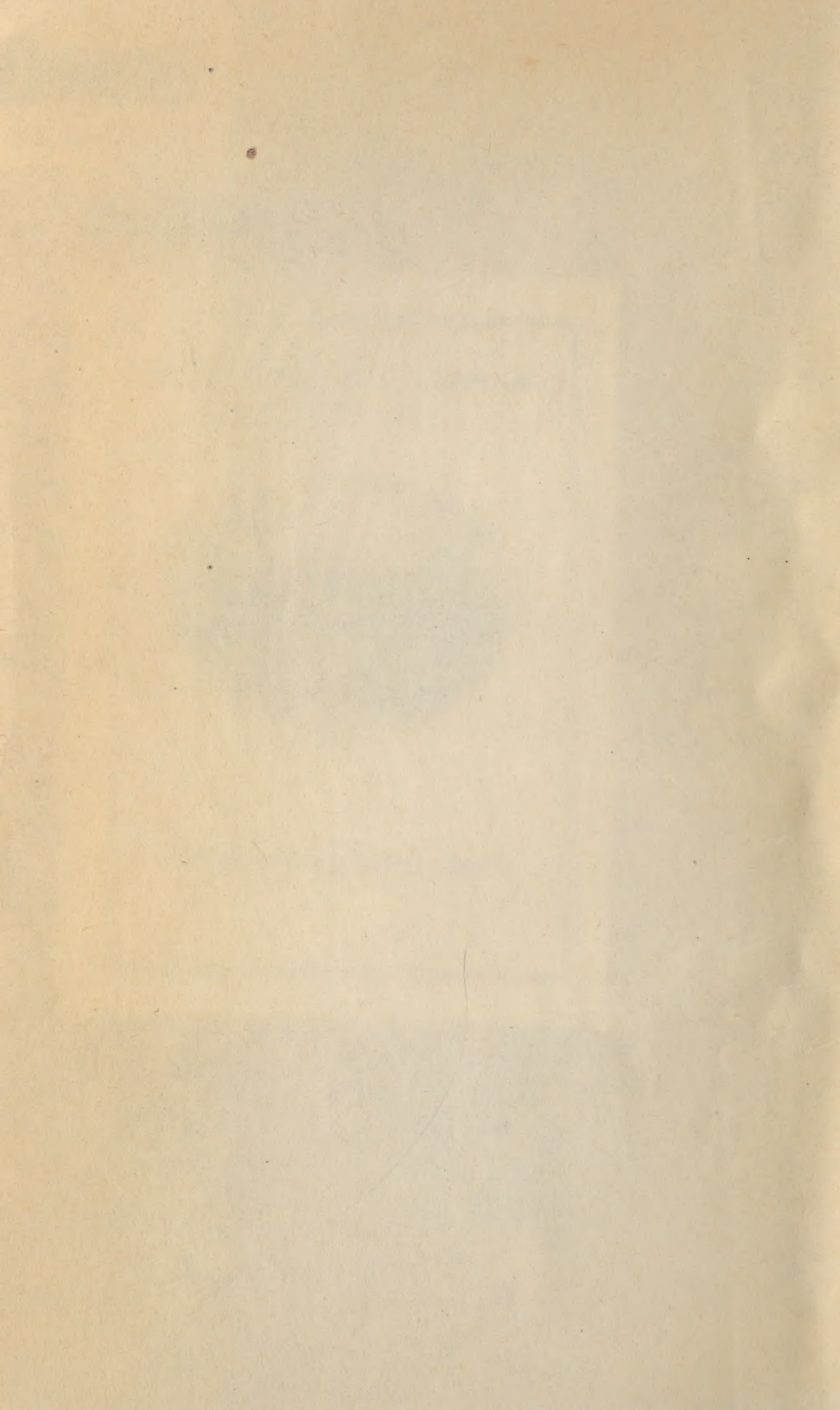
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# HEALTH AND SAFETY ACT and the HEALTH AND SAFETY RULES

of the

STATE OF ILLINOIS  
in force September 1, 1944



Industrial Commission

ALFRED J. BORAH, Chairman

WILLIAM JOHN GRANATA

JOHN MOULIN

WILLIAM E. KING

ELMER SCHOFIELD



GEORGE R. MURPHY  
Secretary

WILLIAM E. KAISER  
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HEALTH AND SAFETY ACT AND HEALTH AND SAFETY RULES  
OF THE STATE OF ILLINOIS

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## HEALTH AND SAFETY ACT

as amended and in force July 1, 1943

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## HEALTH AND SAFETY OF EMPLOYEES

AN ACT relating to the health and safety of persons employed, vesting in the industrial commission power to make reasonable rules relating thereto; providing for the enforcement thereof; and repealing certain Acts herein named. (Approved March 16, 1936, and as subsequently amended.)

*Be it enacted by the People of the State of Illinois, represented in the General Assembly:*

**SECTION 1.** The industrial commission is hereby vested with the power and authority to administer the provisions of this Act.

**SECTION 2.** This Act shall apply to all employers engaged in any occupation, business or enterprise in this State, and their employees, except as follows:

(a) Nothing contained in this Act shall be construed to apply to any work, employment or operations done, had or conducted by farmers and others engaged in farming, tillage of the soil or stock-raising, or to those who rent, demise or lease land for any such purposes, or to anyone in their employ, or to any work done on a farm or country place, no matter what kind of work or service is being done or rendered.

(b) Nothing contained in this Act shall be construed to apply to employers and employees in the coal mining industry.

**SECTION 3.** It shall be the duty of every employer under this Act to provide reasonable protection to the lives, health and safety of all persons employed by such employer. The Industrial Commission shall, from time to time, make, promulgate and publish such reasonable rules as will effectuate such purposes.

Such rules shall be clear, plain and intelligible as to those affected thereby and that which is required of them, and each such rule shall be, by its terms, uniform and general in its application wherever the subject matter of such rule shall exist in any business, occupation or enterprise having employees.

Nothing in this Act shall be construed to grant to the industrial commission the power to make any rule which will require the submission of any plan, specification or other information concerning any proposed installation, alteration, construction, apparatus or equipment, or in any manner regulate the hours of labor of any employee in this State.

**SECTION 4.** To effectuate the purposes stated in section 3, the industrial commission shall make such rules only for:

(a) The proper sanitation and ventilation of all places of employment to guard against personal injuries and diseases.

(b) The arrangement and guarding of machinery and the

storing and placing of personal property to guard against personal injuries and diseases.

(c) The prevention of personal injuries and diseases by contact with any poisonous or deleterious materials, dusts, vapors, gases or fumes.

(d) The prevention of personal injuries and diseases caused by exposure to artificial atmospheric pressure.

(e) The construction, setting, placing, erecting and maintenance of scaffolds, platforms or other similar frameworks.

**SECTION 5.** Such rules of the industrial commission shall have the force and effect of law.

**SECTION 6.** The industrial commission may appoint advisory committees to suggest rules or changes therein. Representation on such committees of employer and employee shall be equal.

**SECTION 7.** The industrial commission may, on its own initiative, or upon written petition, make, modify or repeal any rule or rules as provided in this Act, conforming with the following procedure:

(a) If the industrial commission shall resolve to institute such proceedings on its own initiative, it shall pass a resolution stating in simple terms the subject matter and purpose of such hearing, and shall place such resolution on file, and the matter shall proceed to hearing and disposition upon such resolution as hereinafter provided.

Every petition for hearing upon rules filed with the industrial commission shall state, in simple terms, the subject matter and purpose for which such hearing is requested. Such petition shall be signed by five (5) employees or five (5) employers, or by a majority of employers, in a specific industry, and when such a petition is filed, the matter shall proceed to hearing and disposition upon such petition as hereinafter provided.

The industrial commission may, on its own motion, or the motion of any interested party, consolidate for joint hearing and joint disposition, any number of pending resolutions and petitions on related subject matters; *provided*, that the provisions of this Act as to notice of hearing shall be complied with as to each such petition or resolution so consolidated.

(b) When the industrial commission on its own initiative determines to consider any rule or rules, or when such a petition is filed, the commission shall set a date for a public hearing on such cause, not less than thirty (30) nor more than ninety (90) days after the date of the passage of the resolution by the commission of its intention to proceed on its own initiative, or after the filing of a petition, as the case may be.

(c) Notice of such hearing shall be given at least 30 days prior to the date of such hearing by publication in a newspaper of general circulation within the county in which the hearing is to be held, and by mailing notice thereof to any employer, and to any association of employers and to any association of employees who have filed with the industrial commission their names and



addresses, requesting notice of such hearings, and stating the particular industry or industries concerning which they desire such notice. The notice of hearing shall state the time, place and subject matter of the hearing.

(d) Hearing shall be held in places reasonably convenient to the persons affected.

(e) At any such hearing, any interested party may submit any evidence pertinent to the subject matter of the hearing.

(f) The industrial commission or any member thereof, shall have the power to administer oaths in connection with any proceeding under this Act.

(g) Upon conclusion of the hearing, the industrial commission shall enter in writing, its decision upon the subject matter of such hearing. Copies of the decision shall be mailed to interested parties whose names shall be on file with the commission, as hereinbefore provided, and a certified copy thereof shall be filed in the office of the Secretary of State at Springfield.

(h) Within thirty (30) days after the entry of a decision, rule or rules by the industrial commission, such commission may correct, modify or vacate such decision, rule or rules of its own motion, or upon written objection. Within such thirty (30) days, any person affected thereby may object in writing to the decision, rule or rules entered by the industrial commission, stating the specific grounds of his objection. The commission, in its discretion, may or may not act upon said objection.

(i) Any person affected thereby, whether or not such person participated in the previous proceedings, may within ninety (90) days after a decision, rule or rules is entered by the industrial commission, file a praecipe for a writ of certiorari in the circuit or superior court of the county in which the subject matter of the hearing is situated, or, if the subject matter is situated in more than one county, then in any one of such counties for the purpose of having the reasonableness or lawfulness of the decision, rule or rules reviewed.

Upon filing of such praecipe, writ of certiorari shall issue directed to the industrial commission, returnable on a designated return date not less than ten (10) nor more than sixty (60) days from the issuance thereof.

The person or the parties filing the praecipe for writ of certiorari, or other interested parties, shall, on or before the return date as fixed, file in the office of the clerk of the court out of which said writ issued, specific grounds of objection to the particular decision, rule or rules sought to be reviewed.

Service of such writ of certiorari shall be had by serving a copy upon any member of the industrial commission or its secretary, which service shall be service upon the commission.

The commission shall certify the record of the proceedings to the said court. For the purpose of a writ of certiorari, the record of the industrial commission shall consist of a transcript of all testimony taken at the hearing, together with all exhibits, or

copies thereof, introduced in evidence, and all information secured by the industrial commission on its own initiative which was introduced in evidence at the said hearing; a copy of the resolution or petition filed with the commission which initiated the investigation, and a copy of the decision filed in the valid cause, together with all objections filed with the industrial commission, if any.

On such certiorari proceedings, the court may confirm or reverse the decision as a whole, or may reverse and remand the decision as a whole, or may confirm any of the rules contained in such decision, and reverse or reverse and remand with respect to other rules in said decision. The order of the court shall be a final and appealable order except as to such portion of the decision of the commission, or as to such rule or rules therein as may be remanded by the court.

The purpose of any such remanding order shall be for the further consideration of the subject matter of the particular decision, rule or rules remanded.

No new or additional evidence may be introduced in the court in such proceeding but the cause shall be heard on the record of the industrial commission as certified by it. The court shall review all questions of law and fact presented by such record, and shall review questions of fact in the same manner as questions of fact are reviewed by the court on certiorari proceedings under the Workmen's Compensation Act.

The court first acquiring jurisdiction by virtue of the filing of a praecipe for writ of certiorari seeking to review any decision, rule or rules of the industrial commission, shall have and retain jurisdiction of such review and of all other reviews from the same decision, rule or rules until such review is disposed of in said court.

Any person who subsequently, and within the time herein provided, has filed praecipe for writ of certiorari, may intervene in said original cause in whatever county it may be pending by making a proper showing.

The industrial commission, in making return to any writ of certiorari where praecipe is filed subsequent to the first praecipe involving the same subject matter, shall file as its return, a statement that the record has theretofore been filed, or is about to be filed, in response to the first praecipe theretofore filed.

At the time of making such subsequent return, the industrial commission shall mail to the attorneys whose names appear on the said writ as attorneys for the petitioner therein, a true copy of the said return filed with the said court, which return shall state the county in which the first praecipe has been filed, the title and number of the case, and the return date of the said first writ of certiorari. Any party filing such subsequent praecipe for writ of certiorari may intervene in the said original proceeding or shall be foreclosed by the decision thereon.

Such intervenor shall be a party to the said proceeding to the same extent as the party who had filed the first praecipe, and may



raise any additional question with respect to the subject matter by filing his specific objections in the said court within such time as the court may direct.

(j) Appeals from all final orders and judgments entered by the said court in review of the decision, rule or rules of the industrial commission, may be taken directly to the Supreme Court by either party to the action within forty-five (45) days after the entry of the order of the said court.

Appeals from orders of the said court shall be in the manner provided by law for other civil cases appealed to the Supreme Court.

Any proceeding in any court affecting a decision, rule or rules of the industrial commission, shall have priority in hearing and determination over all other civil proceedings pending in said court, except election contests.

(k) In all reviews or appeals under this Act, it shall be the duty of the Attorney General to represent the industrial commission and defend its decisions and rules.

**SECTION 8.** The industrial commission shall, in its decision, rule or rules, fix the effective date thereof; *provided*, no such decision, rule or rules shall become effective until ninety (90) days after the entry thereof by the industrial commission, nor shall any such decision, rule or rules become effective during the pendency of any proceedings for review or appeal thereof instituted pursuant to the provisions of this Act in which case such decision, rule or rules shall not become effective until such review or appeal including appeal to the Supreme Court, if any, has been disposed of by final order and the mandate shall have been filed with the industrial commission, and until a period of time has elapsed after the filing of such mandate equal to the period of time between the date of the entry of such decision, rule or rules by the industrial commission and the effective date as originally fixed by said commission.

**SECTION 9.** The industrial commission shall make and publish rules as to its practice and procedure in carrying out the duties imposed upon it by this Act, which rules shall be deemed *prima facie*, reasonable and valid.

**SECTION 10.** The owner, operator, manager or lessee of any place affected by the provisions of this Act and his agent, superintendent, subordinate or employee, and any employer, affected by such provisions, shall, when requested by the industrial commission or any duly authorized agent thereof, furnish any information in his possession or under his control, which the industrial commission is authorized to require; shall answer truthfully all questions required to be put to him; shall admit any member of the industrial commission or its duly authorized representative to any place of employment which is affected by the provisions of this Act for the purpose of making inspection, and shall cooperate in the making of a proper inspection.

**SECTION 11.** The industrial commission or any member thereof shall have power:

(a) To issue subpoenas for and compel the attendance of witnesses and the production of pertinent books, papers, documents or other evidence.

(b) To hear testimony and receive evidence and to take or cause to be taken, depositions of witnesses residing within or without this State in the manner prescribed by law for depositions in civil cases in the circuit court. Subpoenas and commissions to take testimony shall be under seal of the industrial commission.

(c) Service of subpoenas may be made by any sheriff or constable, or any other person. The circuit, superior or county court of the county where any hearing is pending, or any judge thereof, either in term time or vacation, upon application of the industrial commission, or any member thereof, may, in his discretion, compel the attendance of witnesses, the production of pertinent books, papers, records or documents and the giving of testimony before the industrial commission or any member thereof, by an attachment proceedings, as for contempt, in the same manner as the production of evidence may be compelled before said court.

**SECTION 12.** The industrial commission shall make an annual report of its work under the provisions of this Act to the Governor on or before the first day of February of each year; and a biennial report to the Legislature on or before the first day of February of each odd-numbered year.

**SECTION 13.** All notices, orders, decisions, rules and other official action shall be in the name of the industrial commission.

**SECTION 14.** The industrial commission shall keep a full and complete record of all proceedings had before it or any member thereof, and all testimony shall be taken by a stenographer appointed by the industrial commission. The commission shall also keep records which will enable any employer, employee or their agents, to determine all action taken by the industrial commission with respect to the subject matter in which such employer and employee is interested. All such records shall be open to public inspection.

**SECTION 15.** At least once each year, the industrial commission shall publish, in printed form, all of its rules made pursuant to Section 4 of this Act which are in full force and effect at the time of such publication.

**SECTION 16.** The record required to be furnished by the industrial commission as a return to the writ of certiorari shall be furnished by the industrial commission without cost. In any appeal from the decision of the circuit or superior court to the Supreme Court under this Act, the clerk of such circuit or superior court in making up the record for use in the Supreme Court,



shall incorporate therein the original transcript filed by the industrial commission in such circuit or superior court as a return to writ of certiorari, in lieu of a copy thereof.

**SECTION 17.** It shall be the duty of the department of labor to enforce the rules of the industrial commission promulgated by virtue of this Act; *provided*, the said industrial commission shall not take any part in the enforcement of any of its rules made in accordance with section 4 of this Act.

The department of labor, through its authorized agents, is hereby empowered to visit, and inspect at all reasonable times, all places of employment in this State affected by any rule made pursuant to section 4 of this Act; *provided*, that whenever any secret process is used in any factory, mercantile establishment, mill or workshop the owner shall, whenever asked by the department of labor or its authorized agent file with said department an affidavit that the owner has in all respects complied with all effective rules made pursuant to the provisions of this Act and such affidavit shall be accepted in lieu of inspection of any room or apartment in which such secret process is carried on.

In the enforcement of the provisions of this Act, the department of labor and its authorized agents under the direction and supervision of the department of labor, shall give proper notice in regard to any violation of this Act to the persons owning, operating and managing any place of employment affected by any rule made pursuant to section 4 of this Act. Such notice shall be written or printed and signed officially by the director of labor or any person authorized by him, and said notice may be served by delivering the same to the person upon whom service is to be had, or by leaving at his usual place of abode, or business, an exact copy thereof, or by sending a copy thereof to such person by mail.

**SECTION 18.** Any person, firm or corporation, or any agent, manager or superintendent of any person, firm or corporation, who for himself or for such person, firm or corporation, after due notice by the department of labor or its authorized agent given in accordance with the provisions of this Act, fails or neglects to comply with any rule made pursuant to section 4 of this Act, violation of which is referred to in said notice, or who obstructs or interferes with any examination or investigation being made by the department of labor or any of its authorized agents, shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than twenty-five dollars (\$25.00) and not more than one hundred dollars (\$100.00) for the first offense; and upon conviction of the second or subsequent offense, shall be fined not less than fifty dollars (\$50.00) and not more than two hundred dollars (\$200.00); and in each case shall stand committed until such fine and costs are paid unless otherwise discharged by due process of law.

**SECTION 19.** This Act shall be known and may be cited as the "Health and Safety Act."

**SECTION 20.** That "An Act to provide for the health, safety and comfort of employees in factories, mercantile establishments, mills and workshops in this State, and to provide for the enforcement thereof, and to repeal an Act entitled, 'An Act to provide for the health, safety and comfort of employees in factories, mercantile establishments, mills and workshops in this State, and to provide for the enforcement thereof,' approved June 4, 1909," approved June 29, 1915, as amended, be and the same hereby is repealed, such repeal to take effect March 1, 1938. If, however, the Industrial Commission shall make any rules pursuant to Section 4 of this Act, and it is designated in such rules that it is to replace any section or part of the said Act, and such rule becomes effective prior to March 1, 1938, then such section or part of the said Act shall replace such provision of the statute designated in such rule upon the effective date of said rule of the Industrial Commission, and that Section 4 of "An Act in relation to employment creating poisonous fumes or dust in harmful quantities, and to provide for the enforcement thereof," approved June 29, 1915, be and the same hereby is repealed, such repeal to take effect October 1, 1936; and that "An Act providing for the reporting, compiling and publishing of information concerning accidents to and deaths by accidents of employees," approved May 24, 1907, be and the same hereby is repealed, such repeal to take effect upon the passage of this Act.

**SECTION 21.** No repeal of any Act herein contained shall extinguish or in any way affect any right of action thereunder, existing at the time this Act takes effect.

APPROVED March 16, 1936.

#### DEPARTMENT OF LABOR—POWERS AND DUTIES.

*AN ACT to amend section 44 of an Act in relation to the civil administration of the State government, and to repeal certain Acts therein named. (Approved March 7, 1917.)*

*Be it enacted by the People of the State of Illinois, represented in the General Assembly:*

**SECTION 1.** Section 44 of "An Act in relation to the civil administration of the State Government, and to repeal certain Acts therein named," approved March 7, 1917, as amended, is amended to read as follows:

**SECTION 44.** The Department of Labor shall exercise and discharge the rights, powers and duties vested by law in the industrial board under an Act entitled, "An Act to promote the general welfare of the people of this State by providing compensation for accidental injuries or death suffered in the course of employment in this State; providing for the enforcement and administering thereof, and a penalty for its violation, and repealing an Act entitled, 'An Act to promote the general welfare of the people of this State by providing compensation for accidental



injuries or death suffered in the course of employment,' approved June 10, 1911, in force May 1, 1912," approved June 28, 1913, in force July 1, 1913, and *Health and Safety Act enacted by the Fifty-ninth General Assembly at the third special session, and Workmen's Occupational Diseases Act enacted by the Fifty-ninth General Assembly at the third special session*, or any future amendments thereto or modifications thereof.

Said *Acts* and all amendments thereto and modifications thereof, if any, shall be administered by the industrial commission created by this Act, and in its name, without any direction, supervision, or control by the Director of Labor.

The industrial commission shall also, in its name and without any direction, supervision or control by the *Director of Labor*, administer the arbitration and conciliation Act.

APPROVED March 16, 1936. (Smith-Hurd, p. 3071; Cahill, p. 785).

## PART "A"

Effective May 1, 1938

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## PART "A"

### PURPOSE AND APPLICATION, SCOPE, ARRANGEMENT AND NUMBERING, DEFINITIONS, AND INTERPRETATION OF HEALTH AND SAFETY RULES

#### CHAPTER I

##### SEC. 1. PURPOSE AND APPLICATION

The purpose of these rules, pursuant to the provisions of the Health and Safety Act, is to provide reasonable protection to the lives, health and safety of persons employed in this State, and these rules shall apply wherever the subject matter thereof shall exist in any business, occupation, or enterprise in this State having employees, except as follows:

(a) Nothing contained in these rules shall be construed to apply to any work, employment or operations done, had or conducted by farmers and others engaged in farming, tillage of the soil or stock-raising, or to those who rent, demise or lease land for any such purposes, or to anyone in their employ, or to any work done on a farm or country place, no matter what kind of work or service is being done or rendered.

(b) Nothing contained in these rules shall be construed to apply to employers and employees in the coal mining industry.

##### SEC. 2. SCOPE

The scope of these rules, pursuant to the provisions of the Health and Safety Act, is intended to be limited to the following only:

(a) The proper sanitation and ventilation of all places of employment to guard against personal injuries and diseases.

(b) The arrangement and guarding of machinery and the storing and placing of personal property to guard against personal injuries and diseases.

(c) The prevention of personal injuries and diseases by contact with any poisonous or deleterious materials, dusts, vapors, gases or fumes.

(d) The prevention of personal injuries and diseases caused by exposure to artificial atmospheric pressure.

### SEC. 3. ARRANGEMENT AND NUMBERING

Health and Safety Rules made by the Industrial Commission are divided into main divisions called "Parts," designated "Part A," "Part B," etc. Each "Part" is subdivided by chapters; each chapter is subdivided by sections, and each section is subdivided by rules. A separate series of numbers is used in numbering chapters of each "Part," sections of each chapter, and rules of each section. Where a rule consists of more than one paragraph, or where sub-paragraphs are used, such paragraphs and sub-paragraphs are appropriately designated to facilitate ready reference.

### SEC. 4. DEFINITIONS

*Rule 1. General Definitions:* The following definitions shall apply in connection with all rules made by the Industrial Commission.

(a) The term "Health and Safety Act" shall mean the Health and Safety Act of the State of Illinois.

(b) The term "Industrial Commission" shall mean the Industrial Commission of the State of Illinois.

(c) The term "Department of Labor" shall mean the Department of Labor of the State of Illinois.

(d) The words "shall" or "must" where used in these rules are to be understood as mandatory.

### SEC. 5. INTERPRETATION OF RULES

*Rule 1. General Interpretations:* The following interpretations shall apply in connection with all rules made by the Industrial Commission:

(a) These rules shall be interpreted liberally so as to effectuate their intent of providing reasonable protection to the lives, health and safety of employees within the scope authorized by statute.

(b) These rules shall be deemed to constitute minimum standards for providing reasonable protection to the lives, health and safety of persons employed in this State. Where protection equivalent or superior to that afforded by any applicable rule or rules made by the Industrial Commission is provided, such equivalent or superior protection shall be deemed compliance with such rule or rules.

(c) Nothing contained in these rules shall be interpreted as prohibiting any employer from enforcing additional safeguards or regulations for protection to the lives, health and safety of persons employed by such employer, provided such additional safeguards or regulations do not conflict with rules made by the Industrial Commission.



## PART "B"

As Amended and in Force September 1, 1944

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## PART "B"

### RULES AND REGULATIONS RELATING TO GUARDING OF MECHANICAL POWER-TRANSMISSION APPARATUS, PRIME MOVERS, AND MOVING PARTS OF MACHINERY, AND GUARDING OF OPERATION OF MACHINERY

#### CHAPTER I

#### SCOPE AND DEFINITIONS

##### SEC. 1. SCOPE AND DEFINITIONS

*Rule 1. Scope:* The scope of Part "B" of rules made by the Industrial Commission comprises rules made primarily for the purpose of prevention of personal injuries to employees due to accidents.

*Rule 2. Definitions:* The following definitions shall apply in connection with all rules included in Part "B" of rules made by the Industrial Commission:

*Class "A" or "B":* The designation "Class A" with a rule means that the rule applies for all kinds of work. The designation "Class B" means that the rule applies unless the nature of the work will not permit.

*Exposed to Contact.* The term "exposed to contact" shall mean such location of any object as will permit contact with same by any person in the course of employment.

*Guarded.* Unless otherwise specified, the term "guarded" shall mean that the object is so covered, fenced or enclosed that accidental contact with the point of danger is reasonably remote.

*Guarded by Location.* "Guarded by location" means that the object is so located that it is not "exposed to contact."

*Point of Operation.* "Point of operation" of a machine means that part of the machine where stock is actually inserted and/or maintained during any process of forming, shaping or other necessary operation.

*Danger Zone.* The term "Danger zone" shall mean any place at the point of operation, where the operator may be caught between moving parts of the machine or between mov-

ing and stationary parts of machine, or between the material and the moving part or parts of the machine.

*Securely Fastened.* "Securely fastened" means that the safety device or object referred to shall be so secured in place that it cannot be moved under normal operating conditions or circumstances.

*Substantial Construction.* "Substantial construction" shall mean construction of such strength, of such material, and of such workmanship that the object referred to shall, under normal or reasonably foreseen circumstances, withstand all reasonably expected shock, wear, usage, and deterioration for which the object was designed.

*Standard Railing.* A "standard railing" is a barrier of substantial construction.

*Standard Toe Board.* A "standard toe board" is a vertical barrier at floor or working level to prevent falls of tools and materials.

*Maintenance Runway.* "Runway" means any permanent runway or platform used for oiling, maintenance, running adjustment or repair work, but not for passageway.

*Plant Roadway.* The term "plant roadway" shall be deemed to mean a plant roadway wide enough to be used for horse drawn vehicles or highway motor driven vehicles, and shall not be construed to include ordinary aisles and passageways.



## PART "B"

### CHAPTER 2

#### GUARDING OF MECHANICAL POWER-TRANSMISSION APPARATUS, PRIME MOVERS, AND MOVING PARTS OF MACHINERY

##### SEC. 1. SCOPE AND DEFINITIONS

*Rule 1. Scope:* The rules contained in this Chapter 2 of Part "B" of rules made by the Industrial Commission shall apply to all moving parts of machinery and equipment used in the mechanical transmission of power, including prime movers, intermediate equipment, and driven machines, up to the machine proper and excluding point of operation. They also include connecting rods, cranks, flywheels, shafting, spindles, pulleys, belts, chains and sprockets, ropes and rope drives, gears, friction drives, cams, couplings, counterweights, revolving or reciprocating parts up to but not including point of operation. Also all bolts, keys, set screws, oil cups, or similar projections.

*Rule 2. Definitions:* The following definitions shall apply to Chapter 2 of Part "B" of these rules:

*Belt Pole.* A "belt pole", sometimes called a "belt shipper" or "shipper pole", is a device used in shifting belts on and off pulleys on line or countershaft where there are no loose pulleys.

*Belt Shifter.* A "belt shifter" is a device for mechanically shifting belts from tight to loose pulleys or vice versa, or for shifting belts on cone pulleys.

*Nip Point.* The term "nip point" shall mean the point of contact between the belt and pulley on the inrunning side.

*Flywheels.* The term "flywheel" shall include flywheels, balance wheels, and pulleys mounted and revolving on crank shaft of engine or other shafting.

*Gears.* The term "gears" shall include a set or train of gears comprising two or more intermeshing gears.

*Prime Mover.* The term "prime mover" includes steam, gas, oil, and air engines, electric generators and motors, steam and hydraulic turbines.

*Sheaves.* "Sheaves" are to be considered as grooved pulleys and so classified unless used as flywheels.

*Sprockets.* A set of "sprockets" comprise two or more sprockets carrying one or more chains.

## SEC. 2. MOVING MACHINERY

*Rule 1. Moving Machinery:* On all machines where a moving part leaves less than eighteen (18) inches between another machine or between a wall or any other stationary object when it reaches the limit of its travel, such part if exposed to contact must be guarded or the space shall be barred against passage.

Dangerous moving parts of machinery shall not be oiled or cleaned while in motion.

## SEC. 3. PRIME MOVERS

*Rule 1. Flywheel Guards:* Flywheels located so that any part is six (6) feet or less above the floor or platform shall be guarded in one of the following ways:

(a) With a standard railing. The railing must be placed not less than six (6) inches nor more than twenty (20) inches from the wheel, provided that it shall be not less than fifteen (15) inches from the spokes of wheel or projections. If wheel extends into pit or within two (2) inches of the floor, a standard toeboard shall be installed. If passage over journal or bearing is necessary, the passageway shall be provided with a standard railing and toeboard.

(b) With an enclosure of sheet, perforated, or expanded metal or woven wire. When such guard is placed less than six (6) inches from wheel, it shall be not less than six (6) feet high, except if flywheel is less than six (6) feet high, the guard shall be not less than the height of the wheel from the floor. In no case shall guard be less than three (3) feet six (6) inches high unless wheel is completely enclosed, including the top. Where clearance of guard from flywheel at any point is under four (4) inches, the largest mesh or opening allowable shall not be more than one-half ( $\frac{1}{2}$ ) inch. Where such clearance is from four (4) to fifteen (15) inches, largest mesh or opening allowable shall not be greater than two (2) inches.

(c) Flywheels, with smooth rims, five (5) feet or less in diameter, other than wheels having solid web centers, where the preceding methods cannot be applied shall be provided with a disc having a smooth surface and edge attached to the flywheel in such a manner as to cover the spokes of the wheel on the exposed side. The disc may be four (4) inches smaller in radius than the radius of the inner surface of the wheel if it is desired to provide space for bar in turning over the wheel. Keys and other dangerous projections not covered by disc shall be cut off or covered.

(d) An adjustable guard may be used where it is necessary to start engine or for making adjustments.

(e) A slot opening for jack bar will be permitted.

(f) Spokes of pulleys, balance wheels or flywheels other than on a prime mover, the bottom of which is six (6) feet or

less above the floor or other working level shall be protected by filling in the spokes or by guarding as required for belts.

*Rule 2. Cranks and Connecting Rods:* Cranks and connecting rods, unless guarded by location, shall be enclosed in such a way as to prevent accidental contact with them, or shall be guarded by a standard railing placed not less than fifteen (15) inches nor more than twenty (20) inches from the moving parts.

*Rule 3. Tail Rods or Extension Piston Rods:* Tail rods or extension piston rods shall be enclosed in such a way as to prevent accidental contact with them, or shall be guarded by a standard railing on sides and end, with a clearance at end of not less than fifteen (15) inches when rod is fully extended.

*Rule 4. Governor Balls:* Revolving governor balls exposed to contact six (6) feet or less from the floor or other working level, shall be guarded by a substantial wire screen of not less than No. 20 U. S. standard gauge, or solid enclosure extending to the top of the governor balls when at their highest position.

*Rule 5. Governors and Automatic Engine Stops:* Where mechanically possible, every engine or turbine shall be equipped with an effective governor to automatically control the speed of the engine under varied loads; except in case of reversing engines or other special types of engines without flywheel effect and operating against a constant load.

The governing mechanism shall be such that in the event of failure of the speed governor, the flow of energy to the machine will stop.

In case the main speed governor is of such design that it stops flow in event of its own failure, and is provided with a blocking mechanism to facilitate restarting, such blocking mechanism shall automatically fall out of the blocking position when the machine is started.

In case the main speed governor is of such design that it leaves the governing valve open in event of its own failure, an independent governing mechanism shall stop the flow of energy to the machine in case of overspeed, and shall be of such type that, having operated, it must be reset by hand before the machine can again be started.

In every tenant factory building where power is furnished from a prime mover not under control of a tenant, means shall be provided for the tenant to disconnect his main shaft from main power supply.

## SEC. 4. POWER-TRANSMISSION EQUIPMENT

### *Rule 1. Guarding Horizontal Shafting:*

(a) All exposed parts of horizontal shafting exposed to contact, six (6) feet or less from floor, walkway level or working platform, except runways used exclusively for oiling or making adjustments, shall be completely encased with stationary guards or by a trough encasing sides and top or sides and bottom of shafting as location requires.



(b) Wherever shafting extends over a plant roadway it shall be completely encased with stationary guards or a trough enclosing both sides and bottom unless it is located fifteen (15) feet or more above the said roadway.

(c) Transmission shafting under bench machines shall be—

(1) Completely encased with stationary guards, or

(2) By a trough encasing sides and top or sides and bottom of shafting as the location requires; the sides of the trough shall come within at least six (6) inches of the underside of the table, or if the shafting is located near the floor, within six (6) inches of the floor. In every case the sides of the trough shall extend at least two (2) inches above or below the shafting, as the case may be; or

(3) Shall be protected on exposed sides with a rigid guard of not greater than two-inch mesh extending from the underside of bench top to bottom line of shafting; such guards shall be at least six (6) inches from the shafting.

*Rule 2. Guarding Vertical or Inclined Shafting:* Vertical or inclined shafting exposed to contact within six (6) feet or less of floor or working platform, except runways used exclusively for oiling or making adjustments, shall be substantially encased with stationary guards to a height of six (6) feet from the floor or other working level. Exception—This rule shall not apply to shafting which is an integral part of a machine such as vertical boring mills.

*Rule 3. Shafting, Pulleys and Belts in Basement, Towers and Rooms:* When shafting, pulleys and belts are located in basements, towers, and rooms used exclusively for power transmission equipment, the requirements for safeguarding shall not apply if the following conditions are met:

(a) Where the basements, towers or rooms, or the shafting, pulleys and belts located therein, are guarded by location; or

(b) Where effective means are taken to prevent entrance to the basements, towers or rooms while the shafting, pulleys or belts located therein and exposed to contact are in operation.

*Rule 4. Guarding of Clutches and Couplings:*

(a) All shaft coupling hereafter installed shall be of the safety type, with bolts and nuts countersunk or protected by a flange.

(b) Existing couplings not of the safety type, and all clutches if exposed to contact, shall be substantially encased, except that existing couplings mounted on shafting heretofore guarded by standard railings placed not less than twelve (12) inches nor more than twenty (20) inches from any moving part, shall be accepted.

*Rule 5. Projecting Shafts Ends:* Projecting shafts ends shall have a smooth edge and end and shall not project more than

one-half ( $\frac{1}{2}$ ) the diameter of the shaft unless guarded by non-rotating caps, safety sleeves or enclosures.

**Rule 6. Keys, Set Screws and Other Projections on Revolving Shafts:**

(a) All set screws in collars or couplings shall be made flush or countersunk beneath the surface of the metal part in which they are inserted, or they may be protected with cylindrical safety sleeves. The covering of set screws with leather bands or wooden blocks other than cylindrical wooden sleeves shall not be permitted.

(b) All keys, bolts, set screws, oil cups and similar projections, when not within the plane of the rim of pulley, gear or wheel shall be either removed, made flush or protected with cylindrical safety sleeves or by a stationary enclosure. Such projections on the hubs of pulleys, when within the plane of the rim, shall be guarded if the pulley is twenty-four (24) inches or more in diameter, when the hubs are within six (6) feet of the floor and are within eighteen (18) inches of a shafting bearing.

(c) Pulleys, gears, pinions and sprockets that are broken shall be removed from revolving shafting.

(d) Unused key-ways shall be filled up or covered.

**Rule 7. Gears, Friction Drives, Sprockets and Chains:** Gears, friction drives, sprockets and chains, except where guarded by their location, shall be guarded as follows:

(a) The gears and sprockets shall be completely enclosed or fitted with a band guard covering the face and having side flanges extending inward beyond the root of the teeth. In the case of arm or spoke gears or sprockets having a spoke hazard, provisions shall be made to guard the opening between arms or spokes; or

(b) With a solid casing or screen guard covered on the top, unless the sides of the guard are at least three (3) feet high and extend at least two (2) feet above the top of the gear. The maximum required height for such guards shall be six (6) feet from the floor or working level. When the guard is within four (4) inches of gears the maximum mesh opening shall not be more than one-half ( $\frac{1}{2}$ ) inch.

**Rule 8. Friction Drives:**

(a) The contact points of all friction drives when exposed to contact shall be enclosed.

(b) In case of friction drives having an arm or spoke hazard, provision shall be made to guard openings between arms or spokes.

(c) In case of web friction drives with holes in the said web, the holes shall be covered or the drives be enclosed.

(d) All projecting bolts on friction drives where exposed to contact shall be guarded.

(e) The chains of sprockets and chain drives, located within seven (7) feet of the floor or other working level, and traveling at a speed of forty (40) feet or more per minute, shall be enclosed on all exposed sides, or guarded by a standard railing placed not less than twelve (12) inches nor more than twenty (20) inches from a moving part.

(f) This rule shall not apply to chain conveyors.

*Rule 9. Static Electricity from Belts or Shafting:* Where explosives, explosive dusts or explosive vapors are present, the hazard of sparks from static electricity from belts or shafting shall be removed by means of metallic flexible tooth combs or a grounded spring copper brush in contact with the shafting. When metallic flexible tooth combs are used, they shall be the same width as the belts. One comb shall be placed within ten (10) inches of the line of contact where the belt leaves each pulley or flywheel. These combs shall be in contact with and placed transversely to the belt and shall also be well grounded with insulated copper wire. The teeth of the comb shall point in the direction of the belt motion.

*Rule 10. Belts, Ropes, Pulleys and Balance Wheels or Flywheels, other Than Those Attached to a Prime Mover:* Belts, ropes, pulleys and balance wheels or flywheels six (6) feet or less from floor, walkway level or working platform (except runways used exclusively for oiling or making adjustments), other than those attached to a prime mover, shall be completely enclosed or effectively guarded and the guards shall be securely fastened in place and shall be of substantial construction, as follows:

(a) The uprights used for support shall be made of substantial material such as structural shapes, rods, tubing, pipe or other materials, the sizes varying according to the weight and size of guard and its location with respect to aisles and passageways and possibility of being damaged by moving equipment.

(b) The guard or filling material shall be expanded metal, perforated or solid sheet metal, wire mesh or other material of equivalent strength and so constructed that no sharp points or edges will be exposed.

(c) Any panel in a guard exceeding forty-two (42) inches in width shall be supported across its width.

(d) Where it is necessary to have openings in guards to permit access to parts enclosed by such guards, doors, gates or suitable means shall be provided for closing such openings. Such devices for closing openings in guards hereafter installed shall be provided with suitable means for securing the closing device in the closed position.

(e) Where guard or enclosure is within four (4) inches from mechanism to be guarded, it shall completely enclose the mechanism or be not less than six (6) feet in height. Any opening through guard shall reject a ball one-half ( $\frac{1}{2}$ ) inch in diameter.



(f) Where guard or enclosure is more than four (4) inches and less than fifteen (15) inches distant from mechanism to be guarded it shall completely enclose the mechanism or be not less than five (5) feet in height. Any opening through guard shall reject a ball one and one-half ( $1\frac{1}{2}$ ) inches in diameter. Slatted guards, if used, shall not have openings greater than one (1) inch in width.

(g) Where rods, pipes, or like material are being handled by workmen, guards specified in this Rule 10 shall be so constructed that such materials will not enter the openings in the guards and come in contact with moving machinery.

(h) Where belts are manipulated by hand and wire lacing is used, the ends of the wire shall be drawn through and clinched at the outer surface in such a manner as to prevent the ends from becoming loose and projecting beyond either surface of the belt; where belt hooks or other metal fasteners are so used, no clinched points or other metal parts shall protrude through the belt, or be fastened on the pulley or inside surface of the belt. Any metal on outside surface of belt shall be smooth and free from any projections. Frequent inspections shall be made to assure proper condition of wire lacing and metal fasteners.

*Rule 11. Standard Railings—Construction:* Standard railings shall be 42" in height with a rail midway between the top rail and the floor or working level. Posts shall not be more than eight (8) feet apart. They are to be permanent and substantial, smooth and free from protruding nails, bolts and splinters. If made of pipe, the pipe shall be  $1\frac{1}{4}$ " inside diameter or larger. If made of metal shapes or bars, the section shall be equal in strength to that of  $1\frac{1}{2}$ "x $1\frac{1}{2}$ "x3/16" angles. If made of wood, the post shall be 2"x4" or larger. The top rail, if of wood shall be 2"x4" or two 1"x4" strips, one on top and one at the side of the post. The center rail, if wood, may be 1"x4" or more. Where wood is used it shall be straight grained and free from defects.

Where panels are fitted with expanded metal, wire mesh, or perforated metal, the middle rail may be omitted.

Standard railings shall be placed not less than fifteen (15) inches nor more than twenty (20) inches from the object being guarded.

The rails (metal shapes, metal bars or wood) shall be on the side of the post which gives the best protection and support.

*Rule 12. Standard Toe Boards—Construction:* Standard toe boards shall not be less than four (4) inches in height of wood, metal or other substantial material, or of metal grill not exceeding one (1) inch mesh. Toe boards at flywheel pits shall be placed as close to the edge of the pit as practicable.

*Rule 13. Disc Guards:* A disc guard shall consist of a sheet-metal disc not less than No. 22 gauge fastened by "U" bolts or rivets to spokes of pulleys, flywheels or gears. Where possibility of contact with sharp edges of the disc exists, the edge shall be

rolled or wired. In all cases the nuts shall be provided with lock nuts which shall be placed on the unexposed side of the wheel.

*Rule 14. "U" or Trough Guards:* "U" or trough guards shall be constructed of materials specified in Rule 10 of this Sec. 4. of Chapter 2 of Part "B" of these rules. Edges shall be smooth and if size of guard requires, these edges shall be reinforced by rolling, wiring, or by binding with angle or flat iron.

*Rule 15. Guards for Belts, Rope Drives and Pulley Drives:*

(a) Rope drives or round belts where exposed to contact shall be guarded as required herein for belts. In such cases, the point where the rope drive or round belt runs onto the sheave must be guarded.

(b) Inclined belt guards shall be so installed that the vertical clearance between the lower run of the belt and the floor shall be not less than six (6) feet six (6) inches at any point outside of guard.

(c) Except in the case of inclined belts, a standard railing placed not less than fifteen (15) inches nor more than twenty (20) inches from any point of the belt shall be accepted.

(d) Where standard railings are used to guard inclined belts, the vertical clearance between the lower run on the belt and the floor at the point where railings pass under the belt shall be not less than six (6) feet six (6) inches.

(e) Where both runs of a horizontal belt are within seven (7) feet of the floor level, the guard shall extend at least fifteen (15) inches above the belt or to the height of six (6) feet, but in no case shall it be less than forty-two (42) inches high unless the belt is completely enclosed.

(f) Overhead horizontal belts with lower run seven (7) feet or less from floor or platform level shall be guarded on bottom and sides to a height not less than six (6) inches above the lower run of the belt except where this would bring the guard more than seven (7) feet above the floor.

(g) Where pulleys are of such dimension and so located as to permit passage between upper and lower runs of horizontal belts, standard railing shall be provided and a substantial passageway guarded on sides and top shall be constructed; or all space traversed by belt shall be completely barred against passage.

(h) Horizontal overhead belts located seven (7) feet or more above the floor of a passageway or work place shall be guarded:

(1) In the case of belts six (6) inches or more in width, if traveling 1,000 feet or more per minute; or

(2) In the case of belts four (4) inches or more in width and containing more than two splices, if traveling 800 feet or more per minute.

(i) Guards for overhead belt shall run the entire lower run of the belt and follow the line of the pulley to top of pulley or be carried to the nearest wall, thus enclosing the belt run effectively.

The guard and all its supporting members shall be securely fastened.

The interior surface of all guards, by which is meant the surface of the guard with which a belt may come in contact, shall be free from all projections of any character, except where construction demands it.

Guards shall be constructed of materials as specified in Rule 10 of this Sec. 4 of Chapter 2 Part "B" of these rules, of sufficient strength to retain the belt in event of breakage.

*Rule 16. Guard for Overhead Rope and Chain Drives:*

Overhead rope and chain-drive guard construction shall conform to the rules for overhead-belt guard construction except that the filling material shall be of the solid type as specified in Rule 10 of this Sec. 4 of Chapter 2 of Part "B" of these rules unless the fire hazard demands the use of open construction. A side guard member of the same solid filling material shall be carried up in a vertical position two (2) inches above the level of the lower run of the rope or chain drive and two (2) inches within the periphery of the pulleys or sprockets which the guard encloses, thus forming a trough.

Where it is necessary to have access to parts enclosed by guards, suitable doors or gates shall be provided in accordance with paragraph (d) of Rule 10 of Sec. 4 of Chapter 2 of Part "B" of these rules.

*Rule 17. Exceptions to Rules:*

(a) Flat belts two (2) inches or less in width and round belts three-quarters ( $\frac{3}{4}$ ) of an inch or less in diameter, need not be guarded except at point of contact, unless they run at a speed in excess of seventeen hundred (1700) feet per minute.

(b) Flat belts over two (2) inches wide and not over three (3) inches wide, running at a speed of not over 1,000 feet per minute need be guarded only to a point six (6) inches outward from face of pulley nearest its opposing pulley.

(c) Belts on inside cone pulleys requiring frequent manipulation by hand need not be guarded. Where cone pulleys are located less than three (3) feet from the floor or working level, the cone pulley and belt shall be guarded to a height of three (3) feet regardless of whether the belt is shifted by a belt shifter or by hand.

(d) Guards shall not be required for belts or pulleys that are effectively guarded by location. Where space between machines, or between machines, walls or adjacent objects is so limited as to prevent the use of such space as a passageway



or aisle, the guarding of all belts and pulleys located in such place shall not be required if such space is effectively barred against use.

*Rule 18. Emergency Stops:*

(a) Effective power controlling devices, emergency stops or switches shall be provided in each room, section or department so that any particular unit or group of machines or power-transmission equipment therein can be promptly and effectively shut down.

(b) Emergency stopping devices shall be properly marked and shall be easily accessible to the employees affected, and so located that it is not necessary to travel more than 100 feet to reach them, provided this shall not apply to rolling processes where operator is in constant attendance at the controls.

(c) When a clutch or other power-disengaging device is used effective means for throwing such device into or out of engagement shall be provided.

(d) In case failure of equipment within a room could produce a hazardous condition, such as noxious, toxic, or explosive vapors or gases, an additional control point for such device shall be placed outside the room but adjacent to it and properly marked.

(e) All electrical switches used for emergency stops shall operate by the opening of a normally closed circuit.

(f) The shifting part of jaw clutches and the shifting mechanism part of friction clutch couplings, unless properly guarded, shall be attached to the driven shaft, i. e., the shaft that will be idle when the clutch is disengaged.

(g) Every machine having individual electric drive or drives shall have the electrical switches so located that the power can be shut off from the normal point of operation.

*Rule 19. Belt Shifters:*

(a) Tight and loose pulleys shall be equipped with a permanent belt shifter provided with mechanical means to prevent belt from creeping from loose to tight pulley.

(b) Belt shifter and clutch handles shall be rounded and be located as far as possible from the danger of accidental contact but within easy reach of the operator.

(c) Where overhead belt shifters are not located over machine or benches, the handle shall be cut off six (6) feet six (6) inches above floor level. Control handles shall be so arranged that the operator can stop the equipment from the usual operating position and should be so arranged that they will automatically latch in the neutral position. The handle shall be located outside the guard when clutch is guarded.

(d) When a foot treadle is used to operate a belt shifter

or clutch it shall be so guarded that it cannot be struck accidentally and start the machine.

*Rule 20. Belt Perches:*

(a) Where loose pulleys or idlers are not practicable belt perches in form of brackets, rollers, etc., shall be used to keep idle belts away from the shaft. Perches shall be substantially made and so designed that the shipping of belts to and from them can be safely accomplished.

(b) Paper or fibre tubing at least  $\frac{1}{4}$  inch thick, inside bore at least  $\frac{3}{8}$  inch larger than shafting, split its entire length to facilitate installation and taped at both ends and center after installation may be used instead of belt perches. Other tubing with smooth exterior surfaces may be used for this purpose.

## PART "B"

### CHAPTER 3

#### GUARDING OF POINTS OF OPERATION OF MACHINERY

##### SEC. 1. DEFINITIONS

*Rule 1. Definitions:* The following definitions shall apply to Chapter 3 of Part "B" of these rules.

*Power Press.* A power press is a power-driven machine, fitted with plungers, or dies for the purpose of blanking, trimming, drawing, punching, stamping or forming cold material.

*Foot, Kick and Hand Presses.* Foot, kick and hand presses are machines actuated by foot or hand power only, and fitted with plungers or dies for the purpose of blanking, trimming, drawing, punching or stamping cold material.

*Drop Hammers.* Drop hammers are hammers operated by rope, belt or board, either where the manual effort of the operator in lifting the hammer or weight is supplemented by the power of the shaft or those fully mechanically operated when used on cold material.

*Plunger.* Where the word "plunger" is used it means the reciprocating moving part of the machine or any die piece attached to it, which ever come closest to the stationary die.

##### SEC. 2. METAL WORKING MACHINES

*Rule 1. Power Presses, Foot, Kick and Hand Presses, and Drop Hammers:* Class A.

Power presses, foot, kick and hand presses, and drop hammers, having a grinding, shearing, punching, pressing, squeezing, drawing, forming or cutting action, in which the hand or hands of the employees engaged in connection with the operation of such machines come within the danger zone shall be so constructed or provided with effective safety devices that will prevent the hand or hands of such employees from being in the danger zone at the time of operation. The following shall be deemed compliance with this rule:

(a) Automatic Feed. A feed of such character that services of an operator are not required except at intervals to restock the feeding device or magazine.



(b) Semi-Automatic or Mechanical Feed. An arrangement such as dial feed, slide feed, push feed, rotating feed or other similar arrangement actuated by or attached to the machine, by means of which stock is fed under the plunger without necessitating the operator's hands entering the danger zone, and provided with a guard, enclosure or barrier in front of the plunger.

(c) Limited Plunger Travel (Hand Feed). The machine shall be so arranged that the maximum distance traveled by plunger, from the die, is three-eighths ( $\frac{3}{8}$ ) inch.

(d) Plunger Enclosure (Hand Feed). Where the press is safeguarded by enclosing the ram, the enclosure shall be substantially constructed. The opening between the bottom of the enclosure and the work or the working surface shall not exceed three-eighths ( $\frac{3}{8}$ ) inch in excess of the thickness of the material. The top of the enclosure shall extend at least as high as the upper limit of travel of the ram. There shall be no dangerous shear points between the guard and any moving part. There shall be no openings in the guard which will permit the insertion of a one-half ( $\frac{1}{2}$ ) inch ball if within four (4) inches of any moving point; if farther away than four (4) inches, opening shall not permit the insertion of a one and one-half ( $1\frac{1}{2}$ ) inch ball.

(e) Gate Guard (Hand Feed). A guard or gate, operated by the tripping device of the press, which interposes a barrier in front and on sides of the plunger before the plunger descends and will not permit the press to operate until the hand or hands of the operator have been removed from the danger zone.

(f) Sweep Guard or Movable (Hand Feed). A guard actuated by some movable part of the machine, designed and constructed to furnish protection to the operator at the point of contact or which throws the hands of the operator out of the way as the plunger descends.

(g) Pull Device (Hand Feed). A mechanically operated device attached to the operator's hands or arms which withdraws the operator's hand from the danger zone as the plunger descends.

(h) Hand-operated Device (Hand Feed). An arrangement whereby hands instead of feet are used for tripping the press; the simultaneous action of both hands being required whereby the operator's hand or hands are withdrawn from the danger zone as the plunger descends.

(i) Fixed Guard across Front and along Sides (Hand Feed). A fixed guard or enclosure across front and along both sides of plunger, so arranged that a finger or fingers cannot go under, over or around the guard or enclosure while feeding stock.

(j) One-Hand Device for Foot or Kick Press (Hand

Feed). An arrangement whereby the tripping mechanism of the press is operated by one hand.

(k) Hand Tools. Vacuum pick-ups or other effective hand tools for placing stock under the plunger which do not necessitate the operator bringing the hand or hands within the danger zone of plunger while feeding the press.

*Rule 2. Squaring Shears:* Class B. Squaring shears either mechanical, foot or hand power, and fed by hand, shall have the knives substantially guarded. This rule shall not apply where the material sheared is more than eighteen (18) inches, measured from back gauge to knife. This guard may be a fixed barrier, set not more than three-eighths ( $\frac{3}{8}$ ) inch above the table or the material being sheared. Automatic clamps when cut-outs are filled in so that the fingers of the operator cannot enter the danger zone shall be acceptable as a guard.

*Rule 3. Circular Metals Saws:* Class B.

(a) Circular metal saws shall be provided with a hood which will cover the saw at all times to at least the depth of the teeth.

(b) The hood shall automatically adjust itself to the thickness of and remain in contact with the material being cut at the point where the stock encounters the saw, or

(c) Shall be a fixed or manually adjusted hood or guard provided the space between the bottom of the guard and the material being cut does not exceed three-eighths ( $\frac{3}{8}$ ) inch at any time; provided that this rule shall not apply to:

(1) Saws used for cutting hot metal and saws with periphery speed less than 500 feet per minute, or

(2) Stereotype saws, electrotypes saws and saws used for cutting zinc, copper or brass in photo engraving plants, if a plate glass shield or barrier is provided above the saw, so placed as to afford protection to the operator.

(d) The exposed parts of the saw blade under the table shall be guarded.

*Rule 4. Bar Stock Machine:* Class A. On machines where the revolving bar stock is being machined the bar stock shall be guarded by a trough or tube where it extends beyond the machine, unless guarded by location.

*Rule 5. Centrifugal Oil Extractor:* Class A.

(a) Extractors shall be provided with a cover for the revolving container and the cover shall be kept closed at all times when container is in motion; provided this rule shall not apply to revolving containers equipped with a top ring.

(b) The outer casing or shell shall also be provided with a cover made of at least No. 20 U. S. Standard gauge metal or its equivalent, which shall be kept closed while revolving container or drum is in motion.

*Rule 6. Metal Embossing Machines: Class B.*

Metal embossing machines shall be guarded at the point of operation in the same manner as power presses, or shall be provided with feed which does not require the hands of the operator to come into contact with the die while feeding.

*Rule 7.* Effective power controlling devices, emergency stops or switches shall be provided so that any particular unit or group of wire drawing machines can be promptly and effectively shut down. Such machines hereafter installed shall be guarded as follows:

(a) *Reel Guard.* A stopping device so arranged that it will automatically shut down the take-up block in case the operator should be caught in the wire as it runs from the reel or in case the reel should be drawn up to the frame.

(b) *Take-up Block Guard.* A stopping device so arranged that it will automatically shut down the take-up block in case the operator should be caught on the block and carried around it.

*Rule 8. Planers:* Openings in the bed of all metal planers shall be covered with substantial metal or other suitable covering. Where the table or work thereon travels to within eighteen (18) inches of a wall or other object, the clearance space between the end of the table or work thereon and such wall or object, shall be protected by a standard railing on each side of such clearance space.

### SEC. 3. WOOD WORKING MACHINES

*Rule 1. Band Saw or Band Knife: Class A.* Band wheels of band saws or band knives and all parts of the blade shall be enclosed or guarded except the part between the guide and table that is necessary for the thickness of the material being cut. If a metal guard is used it shall be of not less than 20 U. S. Standard Gauge; if other material is used, the guard shall be of equal strength and firmness.

*Rule 2. Band Resaw: Class A.* Band wheels of band resaws and all portions of the blade shall be enclosed or guarded except the portion between the guide and table that is necessary for the thickness of the material being cut. If a metal guard is used it shall be of not less than No. 20 U. S. Standard Gauge; if other material is used, the guard shall be of equal strength and firmness. The feed rolls shall be enclosed, except such part as may be necessary to feed stock.

*Rule 3. Cork Cutter: Class A.* Cork cutters shall be guarded in one of the following ways:

(a) *Circular Knife.*

(1) A hood shall be provided that will cover the knife at all times to at least the depth of the cutting edges.



(2) The hood shall automatically adjust itself to the thickness of and remain in contact with the material being cut at the point where the stock encounters the knife, or

(3) May be a fixed or manually adjusted hood or guard, provided the space between the bottom of the guard and the material being machined does not exceed three-eighths ( $\frac{3}{8}$ ) inch at any time.

(4) The exposed parts of the cutter blade under the table shall be guarded.

(b) Band Knife.

Band wheels of band knives and all parts of the blade shall be enclosed except that part between the guide and the table that is necessary for the thickness of the material being cut. If a metal guard is used, it shall be not less than No. 20 U. S. Standard Gauge; if other metal is used, it shall be of equal strength and firmness.

*Rule 4. Circular Rip Saw (Manual Feed):* Class B.

(a) A hood shall be provided that will cover the saw at all times to at least the depth of the teeth.

(b) The hood shall automatically adjust itself to the thickness of and remain in contact with the material being cut at the point where the stock encounters the saw, or may be a fixed or manually adjusted hood or guard provided the space between the bottom of the guard and the material being cut does not exceed three-eighths ( $\frac{3}{8}$ ) inch at any time.

(c) The hood or other guard shall be so designed as to prevent a "kick-back" or a separate attachment that will prevent a "kick-back" shall be provided. "Kick-back" devices shall be effective for all thicknesses of material that are cut.

(d) Except when grooving, dadoing or rabbeting, a spreader shall be provided and fastened securely at the rear of saw in alignment with saw blade. It shall be slightly thinner than the saw kerf and slightly thicker than the saw discs.

(e) The exposed parts of the saw blade under the table shall be guarded.

*Rule 5. Self-Feed Circular Rip Saw:* Class A.

(a) A hood or guard shall be provided that will cover the saw at all times at least to the depth of the teeth. The hood or guard need not rest upon the table nor upon the material being cut, but shall extend to a line not more than one-half ( $\frac{1}{2}$ ) inch above the plane formed by the bottom of the feed rolls.

(b) The feed rolls shall be enclosed, except such part as may be necessary to feed stock.

(c) A spreader shall also be provided and fastened securely at the rear of saw in alignment with saw blade, except where a roller wheel is provided back of saw. The spreader shall be slightly thinner than the saw kerf and slightly thicker than the saw discs.

(d) The exposed parts of the saw blade under the table shall be guarded.

**Rule 6. Self-Feed Band Rip Saws: Class A.**

(a) Band wheels of self-feed band rip saws and all portions of the blade shall be enclosed or guarded except the portion between the guide and table that is necessary for the thickness of the material being cut. If a metal guard is used it shall be of not less than No. 20 U. S. Standard gauge; if other material is used, the guard shall be of equal strength and firmness.

(b) The feed rolls shall be enclosed, except such part as may be necessary to feed stock.

**Rule 7. Circular Cross Cut Saws: Class B.**

(a) A hood shall be provided that will cover the saw at all times at least to the depth of the teeth.

(b) The hood shall automatically adjust itself to the thickness of and remain in contact with the material being cut at the point where the stock encounters the saw, or may be a fixed or manually adjusted hood or guard provided the space between the bottom of the guard and the material being cut does not exceed three-eighths ( $\frac{3}{8}$ ) inch at any time; provided this rule shall not apply to circular cross cut saws with stationary tables where the saw moves forward when cutting.

(c) Circular cross cut saws with stationary tables where the saw moves forward when cutting shall have a hood or guard securely fastened to the table that will cover the saw when running idle. The hood or guard shall extend at least two (2) inches in front of the saw teeth, when the saw is in its back position.

(d) The exposed parts of the saw blade under the table shall be guarded over its entire travel.

**Rule 8. Swing Cut Off Saw: Class A.**

(a) A guard shall be provided that will cover the saw, and such guard shall adjust itself to the thickness of the stock being cut.

(b) There shall be an effective device to return the saw automatically to the back of the table when released at any point of its travel.

(c) If a counterweight is used all bolts supporting the bar and weight shall be provided with cotter pins. A bolt shall be put through the extreme end of counterweight bar to prevent dropping of weight, or where the weight does not enclose the rod, a safety chain shall be attached to it to prevent dropping.

(d) Limit chains or other positive stops shall be provided to prevent the saw from swinging beyond the front edge of the table.

**Rule 9. Circular Resaws: Class A.**

(a) A hood shall be provided that will cover the saw at all times, except where the material is being cut.

(b) A spreader shall also be provided and fastened securely at the rear of saw in alignment with the saw blade, except where a roller wheel is provided back of saw. The spreader shall be slightly thinner than the saw kerf and slightly thicker than the saw disc.

(c) Feed rolls shall be enclosed except such part as may be necessary to feed stock.

**Rule 10. Portable Circular Saws: Class A.**

Portable circular saws shall be provided with a hood that will cover the saw teeth at all times except where the material is being cut.

**Rule 11. Jointer or Buzz Planer: Class A.**

(a) A cylindrical cutting head shall be provided.

(b) A guard which adjusts automatically over the cutting head shall be provided. All exposed parts of cutting head shall be guarded.

(c) Where equipped with automatic feed, the feeding mechanism shall be guarded.

(d) Where knives are exposed beneath the table, they shall be guarded.

**Rule 12. Combination Woodworking Machines: Class B.**

Each point of operation of any tool shall be guarded as required for such tool in a separate machine.

**Rule 13. Automatic Lathes: Class A.**

A hood or cover shall be provided enclosing the cutter blades, except at the contact points, while the stock is being cut.

**Rule 14. Matcher: Class A.**

(a) Matchers shall be guarded by hoods or other enclosures that shall be so arranged and maintained as to effectively guard all cutting heads and knives.

(b) Feed rolls shall be enclosed, except such part as may be necessary to feed stock.

**Rule 15. Mortising Machines: Class A.**

(a) Mortising machines except hollow chisel mortisers, shall be provided with thumb stops at each side of the chisel.

(b) Chain mortisers shall be guarded by enclosure on top.

**Rule 16. Moulder: Class A.**

(a) Moulders shall be guarded with hoods or other enclosures that shall be so arranged and maintained as to guard effectively all cutting heads and knives.



(b) Feed rolls shall be enclosed, except such part as may be necessary to feed stock.

*Rule 17 Panel Raiser: Class A.*

(a) Panel raisers shall be guarded with hoods or other enclosures so arranged and maintained as to guard effectively all cutting heads and knives.

(b) Feed rolls shall be enclosed, except such part as may be necessary to feed stock.

*Rule 18. Planer: Class A.*

(a) Planers shall be guarded with hoods or other enclosures so arranged and maintained as to guard effectively all cutting heads and knives.

(b) Feed rolls shall be enclosed, except such part as may be necessary to feed stock.

*Rule 19. Disc Sanders: Class A.*

Disc sanders shall have the periphery and back of revolving head guarded, and the space between revolving discs and edge of table shall not be greater than one-quarter ( $\frac{1}{4}$ ) inch.

*Rule 20. Drum Sander: Class A.*

(a) The exposed parts of the drum, except that portion where the material comes in contact with the abrasive surfaces, shall be guarded.

(b) Feed rolls shall be enclosed except such part as may be necessary to feed stock.

*Rule 21. Shaper: Class B.*

The cutting heads of wood shapers shall be provided with a guard that will prevent the hands of the operator from coming in contact with the knives; provided this rule shall not apply when covered templates at shapers are used, through which work may be fed and which will hold the work up to knife collars; or on inside on circular or irregular shaped pieces.

*Rule 22. Sticker: Class A.*

(a) Stickers shall be guarded with hoods or other enclosures so arranged and maintained as to guard effectively all cutting heads and knives.

(b) Feed rolls shall be enclosed, except such part as may be necessary to feed stock.

*Rule 23. Tenoner: Class A.*

Tenoners shall be provided with hoods or other enclosures so arranged and maintained as to guard effectively all cutting parts and saws.

*Rule 24. Wood Heel Turning Machines: Class A.*

Wood heel turning machines shall be provided with a guard or shield in front of the cutters, except while it is necessary to expose a part of the cutter while turning stock.

*Rule 25. Stave Jointer: Class A.*

The upper half of the rotating head or disc carrying the knives of stave jointers shall be provided with a cover over the sides and front.

*Rule 26. Veneer Clipper or Slicer: Class A.*

Veneer clippers, or slicers, shall be provided with prong guards or shields, both in front and back of the knife, so arranged that the hands of the operator and the man taking away, cannot be caught.

## SEC. 4. PRINTING AND PAPER MACHINES

*Rule 1. Job Platen Press: Class A.*

Job platen presses with or without mechanical power shall be provided with one of the following:

(a) An automatic feed which does not require the operator's hands to be placed between the platen and bed, or an automatic stop which will prevent the platen from closing if the hand or hands of operator are caught between the platen and the bed, or

(b) A guard, gate or sweep motion, mechanically operated, which will throw the operator's hands out of the way as the press closes. If of the type which lifts the hands out of the danger zone, the guard shall rise at least four (4) inches above the platen as the press closes and the guard shall descend by gravity or be drawn down by springs. The guard shall be arranged so that it will prevent a shear between the guard and the top of the platen, or

(c) Any other device that will prevent the platen from fully closing, if the hands of the operator are caught between the platen and bed.

*Rule 2. Cylinder, Rotary and Lithographic Presses: Class A.*

(a) *Cylinder and Lithographic Presses:* The in-running sides of the cylinders and rollers shall be provided with a guard that will protect the operator from being caught between the cylinders, rollers, or bed of the press when working or passing along the sides of the press while the press is in operation, except when guarded by location.

(b) *Rotary Presses:* The in-running sides of power operated rollers and cylinders, except cutting and pinch rollers, shall be provided with a guard or a gate so arranged that any part of the operator's clothing or body will not be drawn into the in-running rollers or cylinders while the press is in operation.

*Rule 3. Embossing Machines: Class A.*

Embossers of the platen or head type shall be equipped with:

(a) A fixed guard enclosing front and sides of platen with space for feeding stock. The guard shall be so arranged

as to protect the operator's fingers from going between the platen and the die while feeding stock, or

(b) A fixed or a movable guard on the sides and a movable guard in front connected with the operating mechanism in such a manner that the operator's fingers will not be caught by the platen while feeding stock, or

(c) A starting device which requires the simultaneous action of both hands to trip the machine, or

(d) A mechanically operated device attached to the operator's hands or arms which withdraws the operator's hands from the danger zone as the platen ascends or descends.

Provided, however, that this Rule 3 shall not apply to machines which feed in such a manner that the hands of the operator do not come between the platen and the bed while feeding.

*Rule 4. Paper Punch: Class B.*

Mechanical or foot power paper punches, except line perforators shall be provided with a gate guard to protect the operator's fingers from coming between the punch and die while the machine is in operation.

*Rule 5. Paper Cutters: Class B.*

Hand and Foot Power: Hand and foot power paper cutters shall be provided with a rod or plate so arranged on the feeding side that the hands of the operator will not reach the cutting edge while holding the paper in place.

*Rule 6. Power-driven Guillotine Paper Cutters: Class B.*

Power-driven guillotine paper cutters shall be provided with:

(a) A non-repeat device that will within its own action automatically lock the clutch mechanism into place so that the cutter cannot make a second stroke until the hand lever is again moved into the cutter starting position, or

(b) A buffer that will interpose a positive stop to some moving part of the machine whenever the clutch fails to perform the function of preventing the cutter from making a repeat stroke.

In addition to the non-repeat device or buffer, power-driven guillotine paper cutters shall be provided with:

(a) A starting device which requires the simultaneous action of both hands during the cutting motion of the knife, or

(b) An arrangement on the starting device or other part of the machine that will interpose a barrier or interlock between the starting level and clutch which must be released through a movement of the hand starting lever before such lever can be moved to the position where it applies power to the cutter.

Provided, however, that this Rule 6 shall not apply to continuous feed trimmers.



*Rule 7. Cutters and Creasers: Class A.*

Drum cylinder type of cutters and creasers shall be guarded so as to protect the operator's hands being caught between the cylinder and the bed.

Where the operation is similar to that of a platen printing press the machine shall be guarded in same manner as provided for in Rule 1 for job platen presses.

*Rule 8. Rotary Scoring Machines: Class A.*

Scorers shall have a guard in front of in-running discs to protect operator's hands from injury while machine is in operation.

*Rule 9. Rotary Creaser and Slitter: Class A.*

Paper creasers and slitters shall be guarded so as to protect the fingers of the operator from coming into contact with the creasing or cutting discs while machine is in operation.

*Rule 10. Slotters: Class A.*

(a) Slotters of vertical type: The knife shall be primarily provided with a stripper, or shall be provided with a guard in front of knives so arranged as to protect the hands of the operator from coming in contact with the knives while machine is in operation.

(b) Rotary Slotters: A guard shall be provided in front of the knives to protect the hands of the operator from coming into contact with the knives while machine is in operation.

*Rule 11. Corner Cutter: Class A.*

Corner cutter, single and double machines with or without mechanical power, shall be provided with a guard to protect the operator's fingers from being injured by the knives.

*Rule 12. Corner Stayer: Class A.*

Corner stayer with or without mechanical power shall be provided with:

(a) An automatic device that will instantly stop the downward motion of the plunger, should the fingers of the operator come between the plunger and the anvil, or

(b) A fixed guard so arranged as to protect the operator's fingers from getting under the plunger while the machine is in operation.

*Rule 13. Ending and Edge Attaching Machines: Class A.*

Paper box ending and edge attaching machines shall be provided with an automatic device which will prevent the application of injurious pressure if the fingers of the operator are between the top of the form and the pressure head.

*Rule 14. Lacing or Ply-Leafing Machines: Class A.*

The pressure plunger shall have attached across its lower front edge a strip of soft rubber or other material of equal elasticity and of at least one-half ( $\frac{1}{2}$ ) inch width to protect the operator's fingers from injury while feeding stock.

## SEC. 5. PAPER MAKING MACHINES

*Rule 1. Calendar Rolls: Class B.*

(a) The calendar rolls shall be guarded or equipped with a feeding device at in-running side so arranged that the material can be fed without permitting the fingers of the operator to be caught between the rolls.

(b) The bottom rolls of the calendar stack shall be guarded at rear of stack in such manner as to prevent persons from putting broken paper through the bottom rolls.

*Rule 2. Paper Slitter: Class B.*

(a) The discs of paper slitters exposed to contact shall be so guarded that the operator cannot come into contact with the cutting edge of disc.

(b) Discs are exposed to contact when within reach of operator while standing on the working floor or platform.

SEC. 6. TEXTILE, LAUNDRY AND FABRIC  
PROCESSING MACHINERY*Rule 1. Shuttles: Class B.*

All looms shall have a shuttle guard constructed in such a manner as to prevent shuttle flying from machine.

*Rule 2. Cards: Class A.*

(a) The cylinder cover on revolving flat type cards must be provided with an interlock, or securely bolted in place, or shall be provided with a stripping device so arranged that the operator cannot come in contact with point of operation.

(b) A licker-in cover shall be provided on all cards and shall be bolted securely in place so that it cannot be readily opened by the operator. The use of thumb screws or wing nuts in same is prohibited.

*Rule 3. Centrifugal Wringers and Extractors: Class A.*

All centrifugal wringers and extractors shall be equipped with safeguards as follows:

(a) Centrifugal wringers or extractors shall be equipped with a cover that will prevent the operator from contacting the revolving basket or its contents, and such cover shall be made of materials at least equivalent in strength to No. 20 U. S. gauge steel.

(b) Centrifugal wringers and extractors shall be equipped with an interlocking device which shall prevent the power operation of the basket while the cover is open.

(c) Centrifugal wringers or extractors installed after adoption of this rule shall be equipped with an interlocking device that will prevent the cover from being opened while the basket is in motion.

(d) Centrifugal wringers or extracators shall be securely fastened to a foundation to reduce vibration to a minimum and such foundation shall be sufficient to prevent excessive vibration of the equipment when there is an extreme out-of-balance load in the basket.

(e) Centrifugal wringers and extractors shall not be operated at a speed in excess of the safe speed in revolutions per minute indicated by the manufacturer of the equipment and such safe speed shall be permanently marked in a conspicuous place on the equipment in letters and figures not less than  $\frac{1}{4}$  inch in height. When the safe maximum operating speed cannot be ascertained from the manufacturer of the equipment, the maximum speed in revolutions per minute shall not exceed the equivalent of more than 9400 peripheral feet per minute for centrifugal wringers and extractors up to and including 48 inches in diameter and for centrifugal wringers and extractors over 48 inches in diameter and not more than 56 inches in diameter, the peripheral speed shall not exceed 8600 feet per minute, and for centrifugal wringers and extractors over 56 inches in diameter and not over 63 inches in diameter the peripheral speed shall not be greater than 7800 feet per minute.

(f) When such centrifugal wringers or extractors are operated by engines or other variable speed driving equipment the centrifugal wringer or extractor or variable speed driving equipment shall be provided with a speed limit governor that will not permit the wringer or extractor to operate beyond its safe rated speed.

*Rule 4. Cotton Picker, Opener and Willoweer: Class A.*

The beater cover shall be provided with a device so arranged that the cover cannot be opened while the beater is revolving or shall be securely bolted in place. The use of thumb screws and wing nuts is prohibited.

*Rule 5. Picker Machines: Class A.*

All machines used in picking wool, hair, rags or other material shall have rolls completely covered, except opening necessary to feed stock. This opening shall be so constructed or guarded that the operator's fingers cannot come into contact with the rolls.

This rule shall not apply in case of machines covered by next preceding Rule 4.

*Rule 6. Carpet Frayer: Class A.*

Cylinder door or cover shall be provided with a device, so constructed that the cover cannot be opened while the roller is revolving, or the cover shall be clamped in place and the slot be so constructed and guarded that the operator's fingers cannot come in contact with the roller.

*Rule 7. Carpet Trimmer: Class A.*

Revolving knives shall be provided with cover or guard which



will prevent the operator's fingers from coming in contact with the knives.

*Rule 8. Pile Cutter: Class A.*

Knife rolls shall be provided with a cover or guard which will prevent the operator's fingers from coming in contact with the rolls.

*Rule 9. Washing Machines, Drying Tumblers and Drum Shakers: Class A.*

Washing machines, drying tumblers or drum shakers having revolving inner cylinders and stationary outer cases, and excepting only drying tumblers of the open end type shall be safeguarded in the following manner:

(a) A positive locking device either electrical or mechanical shall be provided which will prevent the inside cylinder from moving while the case doors are open and also prevent these doors from being opened while the inside cylinder is in motion, except that such device shall not prevent the inching of the cylinder by hand or by inching device.

(b) Washing machines, drying tumblers and drum shakers having revolving cylinders regardless of whether they are equipped or not equipped with outer cases shall be provided with a device which will securely hold the cylinder doors in an open position while being loaded or unloaded.

*Rule 10. Garnett Machines: Class B.*

Openings in lower frame and between lower frame and floor shall be guarded. Where metal guard is used, it shall be not less than No. 20 U. S. Standard gauge.

*Rule 11. Unhairing Machines: Class A.*

All knives used in removing hair from pelts shall be guarded by a solid metal enclosure, completely enclosing knives except opening in guard necessary to feed stock.

*Rule 12. Shredding Machines: Class A.*

The revolving knives and the stationary shearing knife shall be enclosed with a metal or wire mesh guard, openings not to exceed one-half ( $\frac{1}{2}$ ) inch, extending from the top of feed conveyor to a point below the cutting edge of knives.

*Rule 13. Marking Machines: Class A.*

Power operated marking machines shall be guarded at the point of operation in the same manner as power presses, to prevent the fingers and hands of operators from coming in contact with the marking die.

*Rule 14. Power Wringers: Class A.*

The feed or pressure rolls of power operated wringers shall be provided with a guard at the run-in side the full length of the rolls and so arranged as to allow the material to be fed in without permitting the fingers of the operators to become caught be-

tween the rolls; or a quick stopping or reversing device shall be provided which shall cause the rolls to stop or reverse if the guard is contacted by the operator's hands.

*Rule 15. Dampening Machines: Class A.*

Every roll type dampening machine shall have the rolls entirely enclosed and provision shall be made for feeding the material into the rolls through the enclosure by means of a slot not over  $\frac{1}{4}$  inch in width.

*Rule 16. Cylinder and Chest Type Ironers: Class A.*

Flat work ironing machines, body, sleeve, bosom, collar, cuff, band and combination ironers and the like, equipped with power pressure rolls, excepting such types of equipment operated by foot pressure, shall be guarded as per the following:

(a) All such ironing machines shall be equipped with a safety guard located directly in front of the feeding point so constructed that fingers or hands of the operators cannot touch any part of the rolls on the run-in side without tripping the guard. This guard shall be substantially constructed and pivoted to move freely toward the direction of feed, and shall be connected to the main driving clutch in such a manner as to disengage the clutch and positively stop the machine within a distance not greater than the distance between the normal position of the guard and the point of pressure roll contact in case of a slight movement of the guard toward the direction of feed.

(b) Flat work ironers only shall be provided with a combination ventilating hood and enclosure guard over the top of the heating elements. Such hood or guard shall be open only at the feeding and discharge ends of the ironer. Otherwise the hood or guard shall prevent employees from coming in contact with the pressure rolls. The ventilating hood or guard shall be connected to a mechanical exhaust system which shall be kept in operation during the operation of the ironer and such exhaust system shall provide a flow of air into all openings in the hood of not less than an average velocity of 50 feet per minute. Such hood or guard shall be made so that it can be readily removed for inspection and maintenance of the machine. The hot humid air exhausted from such ironers shall be discharged out-of-doors in such a manner as to prevent its reentering the building or being forced into adjacent buildings.

(c) During the operation of reclothing the rolls on flat work ironers only, the power shall be shut off and the machine turned over manually; except in the case of power driven speed control ironers where the low speed does not exceed 25 feet peripheral speed per minute on the ironer rolls, the reclothing may be done by means of power. When rolls are reclothed by means of power an employee shall be stationed at the power shut-off control to shut off the power in case the reclothing operator comes in contact with the rolls.

*Rule 17. Treadle Operated Pressers and Ironers: Class A.*

Treadle operated pressers and ironers shall be so operated as not to require in excess of 75 pounds foot treadle pressure. The foot treadle of such pressers and ironers shall be so located that when the treadle is pressed to its maximum stroke the surface of the treadle is level with the floor or working platform.

*Rule 18. Press Type Body Ironers: Class A.*

Press type body ironers shall be guarded at the point of operation in the same manner as power presses.

*Rule 19. Hand Ironing: Class A.*

The ironing board for hand ironing shall be adjustable for height or the height of such ironing board shall be adjusted to the height of the operator by means of working platforms.

*Rule 20. Power Sewing Machines: Class A.*

Power operated sewing machines for sewing, stitching, button-holing, attaching buttons, darning and the like shall be equipped with a guard firmly attached to the pressure foot or other part of the sewing machine that will prevent the operator's fingers from passing under the needle point during any part of the stroke of the needle. Such guard shall permit threading of the needle without the necessity of loosening or removing the guard, and such guard shall provide for visibility of the sewing operation.

## SEC. 7. LEATHER, PYROXYLINE AND COMPOSITION GOODS MACHINES

*Rule 1. Skiving Machines: Class A.*

The feed rolls shall be so guarded that the operator's fingers cannot go between the rolls.

*Rule 2. Stripper: Class B.*

Strippers shall be provided with a starting device which requires the simultaneous action of both hands during the cutting movement of the knife.

*Rule 3. Dinking Machines: Class A.*

One of the following types of protection shall be provided:

(a) Dies known as "safety type" shall be used throughout. Such dies shall be at least three (3) inches in height with safety grooves or flanges to reduce the danger of the operator's fingers being caught between top of die and beam, or they shall be provided with horizontal handles or with vertical handles at least two and one-half (2½) inches in height above the top of the die proper.

(b) Provision of a sliding table which does not require the operator to place his hands under the beam.

(c) A two-handled device that requires both hands of the operator to be removed from under the beam at the time of tripping the machine.



*Rule 4. Embossing Machines: Class B.*

Embossers of the platen or head type shall be equipped with:

(a) A fixed guard enclosing front and sides of platen with space for feeding stock. The guard shall be placed so as to prevent the operator's fingers being caught between the platen and die while feeding or removing stock, or

(b) A fixed or a movable guard on the sides and a movable guard in front connected with the operating mechanism in such a manner that the operator's fingers cannot be caught between the platen and die while feeding or removing stock, or

(c) A starting device which requires the simultaneous action of both hands of the operator to trip the machine.

(d) When two operators are operating the machine, a starting device which requires the simultaneous action of both hands of each of the operators to trip the machine shall be provided.

This rule shall not apply to machines with automatic or other feed where the hands of the operator cannot come in contact with the die while feeding.

*Rule 5. Heel Compressing Machines: Class A.*

Heel compressing machines shall be equipped with a starting device that requires the simultaneous action of both hands to trip the machine, or shall be provided with a mechanical feeding device so that the hands of the operator cannot come within the danger zone.

*Rule 6. Splitter: Class A.*

(a) Feed rolls on stationary knife splitters shall be so guarded that the operator's fingers cannot go between the rolls.

(b) Band knife splitters shall have all exposed portions of the knife as well as band sheaves enclosed or guarded.

*Rule 7. Tanning Drums: Class A.*

Horizontal revolving drums shall be enclosed or guarded so as to prevent any person coming in contact with them and in addition the drum shall be provided with a substantial device such as a rack, drum or hand wheel locking bar, to prevent the movement of the drum while loading or unloading.

## SEC. 8. FOOD AND TOBACCO MACHINES

*Rule 1. Horizontal Tilting Type Dough Mixers: Class A.*

(a) Horizontal tilting type dough mixers shall be provided with a cover over the top of the mixer. An interlocking device shall be provided, so arranged that power cannot be applied to the agitators unless the mixer is in operating position with cover in place.

(b) The mixer when tilted may be operated with the cover open:

(1) If equipped with an electrical push button, that will require the operator to keep his finger on the button when operating the mixer with the cover open, the button shall be located so that the operator cannot reach into the mixer while pressing the button, or

(2) If belt drive, the belt shifter shall be so arranged that it will move the belt to the loose pulley and hold it there while the mixer bowl is tilted and uncovered, unless the operator holds the belt on the tight pulley. The belt shifter must be so located that the operator cannot reach into the mixer while holding the shifter, or

(3) If clutch driven, the clutch lever shall be so arranged that it will move the clutch out of engagement and hold it out while the mixer is tilted or uncovered, unless the operator holds the clutch in engagement. The clutch lever shall be so located that the operator cannot reach into the mixer while holding the lever.

*Rule 2. Horizontal Non-Tilting Dough Mixers: Class A.*

Horizontal non-tilting type dough mixers shall have a cover with an interlocking device so arranged that power cannot be applied to the agitators unless the cover is in place on the mixer; provided this rule shall not apply to dough mixers that have agitators which are removed for cleaning.

*Rule 3. Rotary Kneaders: Class A.*

Rotary dough kneaders, with open top shall have the top of the kneading cog wheel guarded so the operator's hands cannot come in contact with the cog wheel.

*Rule 4. Dough Brake: Class A.*

Rolls on dough brakes shall be enclosed so that the operator's hands cannot come in contact with the rolls when in motion.

*Rule 5. Cake Cutter: Class A.*

Band wheels and band knives shall be completely housed above and below the table. That portion of the band knife between the bottom of the wheel housing and top of table shall be guarded with a square or circular expanded metal or mesh guard to provide visibility and prevent operator's hand from coming in contact with band knife.

The guard shall be made of not more than three-quarters ( $\frac{3}{4}$ ) inch expanded metal or mesh of not less than number 20 U. S. Standard Gauge, with rounded edges.

*Rule 6. Candy Cutter: Class A.*

The rolls or knives of roller and fan type candy cutters shall be provided with a cover or guard, so arranged that the fingers of the operator cannot come in contact with same.

*Rule 7. Caramel Slitter: Class B.*

The circular knives of caramel slitters shall be provided with a guard which will cover the knives down to the surface of material being fed.

*Rule 8. Candy Breaker: Class A.*

The chains on the chain type candy breakers shall be completely enclosed in a sheet metal cover or wire mesh not to exceed one-quarter ( $\frac{1}{4}$ ) of an inch so that the fingers of the operator cannot come into contact with the chains when feeding the machine or removing the stock.

*Rule 9. Meat, Fish and Other Food Grinders: Class A.*

Shall be provided with a hopper of such size and arrangement that the operator's fingers cannot come in contact with the cutting or feeding knives or worm.

*Rule 10. Ice Breaker or Crusher: Class A.*

Ice breakers or crushers shall be provided with a hopper of such size and arrangement that the hands of the operator cannot come into contact with the revolving teeth or prongs while the machine is in operation.

*Rule 11. Bottling Machine: Class A.*

Pressure bottling machines shall be provided with an enclosure made of sheet metal not less than No. 18 U. S. Standard gauge, wire mesh or screen openings not to exceed one-quarter ( $\frac{1}{4}$ ) of an inch, and shall be so arranged on the machine that broken glass cannot fly in any direction and strike employees. The enclosure shall extend downward at sides and rear to a point level with the base of that part of the machine on which the bottle stands while being filled, and upward to a point at least four (4) inches higher than the top of the bottle, and be so constructed that each bottle, when being filled, shall be protected similarly by a solid guard on the side facing the operator. When the bottling is done under a pressure of more than seventy-five (75) pounds, such enclosure shall be constructed of metal not less than No. 12 U. S. Standard gauge.

*Rule 12. Tobacco Stem Crusher: Class A.*

The rolls shall be so enclosed that it will not be possible for the operator's fingers to come in contact with them.

*Rule 13. Cigar Cutter: Class A.*

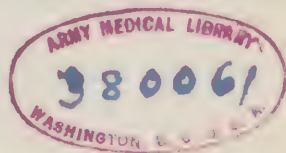
(a) The knives shall be provided with a metal cover that will enclose the knives, or

(b) A feed hopper or feed belt shall be provided of such size and so arranged that material may be fed without the operator's fingers coming in contact with the knives.

## SEC. 9. CHEMICAL MACHINES

*Rule 1. Linter: Class A.*

Breast when hinged, shall be provided with a device so ar-





ranged that it cannot be raised while the saw cylinder is running. When not hinged, breast shall be securely bolted in place, excluding the use of thumb screws and wing nuts. Shields shall be provided in front of openings beneath the lower breast and grate fall and beneath the grate fall which will prevent the operator from reaching up into the saws.

*Rule 2. Washing Machines: Class A.*

(a) Each washing machine shall be equipped with an interlocking or other device that will prevent the inside cylinder from moving, when the outer door on the case or shell is open more than six (6) inches.

(b) The movement of the inner cylinder by a hand operated worm wheel or by the operation of an inching device is permitted.

(c) Each washing machine shall be provided with means for holding open the doors or covers of the inner cylinder and outer shell, while being loaded or unloaded, except when doors of inner cylinders and outer shell are hinged at bottom or slide downwardly.

*Rule 3. Extractors: Class B.*

Centrifugal extractors shall be provided with a cover for outer casing or shell, which shall be kept closed at all times while basket is in motion.

*Rule 4. Mills: Class A.*

(a) Mills shall be equipped with a quick stopping or reversing device, so arranged that the operator can actuate the device while in his usual working position should his hands be caught, or

(b) Shall be provided with a hopper of such size and arrangement that the hands of the operator cannot come in contact with the rolls.

*Rule 5. Soap Presses: Class A.*

Hand fed soap presses shall be guarded, at point of operation, as specified in Rule 1 of Sec. 2 of Chapter 3 of Part "B" of these rules.

## SEC. 10. RUBBER, COMPOSITION AND BONE WORKING MACHINES

*Rule 1. Calendar Rolls: Class A.*

Calendar machines shall be equipped with a quick stopping or reversing device, so arranged that the operator can actuate the device while in his usual working position should his hands be caught.

*Rule 2. Chopper (Rubber): Class B.*

Rubber choppers shall be provided with an adjustable metal or wire mesh guard with openings not to exceed one-quarter ( $\frac{1}{4}$ )

inch. The guard shall extend across the front and rear of the cutting blade, so that the fingers of the operator cannot come in contact with the knife.

*Rule 3. Chopper-Rubber Band (Revolving Type):* Class A.

The cutter head and knives shall be enclosed with a guard made of sheet metal or wire mesh with slots or openings not to exceed one-quarter ( $\frac{1}{4}$ ) inch. The guard shall extend at least twelve (12) inches below on the discharge side, not less than six (6) inches in front of cutting head and not more than three (3) inches above the table on the feed side.

*Rule 4. Cutter-Bevel (Circular Knife):* Class A.

The circular knife shall be enclosed in a metal hood which shall cover all exposed parts of the blade, except the part which shall be used for cutting material. The sliding table shall be provided with a stop that will limit its travel so the knife cannot extend beyond the table.

*Rule 5. Cutter-Sheet Rubber (Horizontal Cutter Type):* Class A.

The exposed portion of the knife at the sides of the sliding table shall be covered with a metal enclosure. When enclosure is not of the solid type, openings shall not exceed one-quarter ( $\frac{1}{4}$ ) inch.

*Rule 6. Rubber Mills:* Class A.

(a) Mills shall be equipped with a quick stopping or reversing device, so arranged that the operator can actuate the device while in his usual working position should his hands be caught, or

(b) Shall be provided with a hopper of such size and arrangement that the hand or hands of the operator cannot come in contact with the rolls.

*Rule 7. Saws and Slitters:* Class A.

(a) A guard shall be provided that will cover the saw or knife at all times to at least the depth of the teeth or cutting edge. The guard shall:

(1) automatically adjust itself to the thickness of and remain in contact with the material being cut at the point where the stock encounters the saw or knife, or

(2) be a fixed or manually adjusted hood or guard if the space between the bottom of the guard and the material being cut does not exceed three-eighths ( $\frac{3}{8}$ ) inch at any time.

(b) The exposed part of saw blades under the tables shall be guarded.

## SEC. 11. PUG MILLS

*Rule 1. Pug Mills: Class A.*

Pub mills shall have:

(a) A substantial grating which shall completely cover the openings. The bars of grating shall not be more than four (4) inches apart, or

(b) A cover projecting at least four (4) inches beyond opening on all sides which may be placed not more than eight (8) inches above the machine or floor, or

(c) A hopper completely covering the opening through which machine is fed, and extending not less than thirty-six (36) inches above the upper level of the opening.

(d) Where a conveyor is used the opening at the mill shall be guarded.

## SEC. 12. VATS, PANS AND TANKS

*Rule 1. Vats, Pans and Tanks: Class A.*

(a) Vats, pans and tanks containing hot liquids, acids, alkali or other injurious chemicals when so set that the opening or top thereof is less than thirty (30) inches from the floor or other working level, shall be guarded on all exposed sides by a standard railing or by substantial railing of such height that the distance from floor or other working level to top of such railing shall not be less than three (3) feet or the top shall be entirely covered except when loading or unloading.

In the case of such open vats, pans and tanks, where the top is less than three (3) inches from the floor or other working level, a standard toe-board shall be installed in addition to the railing.

(b) The sides of tanks used in connection with paper mill beater engines shall in existing installations be not less than thirty-six (36) inches above the floor or other working level; and in future installations not less than forty-two (42) inches above the floor or other working level. If less than thirty-six (36) inches in existing installations and forty-two (42) inches in future installations, such tanks shall be guarded by a substantial rail not less than forty-two (42) inches nor more than fifty-four (54) inches from the floor, extending to a point not less than seven (7) feet from cover of beater cylinder.

## SEC. 13. COUNTERWEIGHTS

*Rule 1. Counterweights Suspended Vertically: Class A.*

Counterweights suspended vertically and exposed to contact shall be guarded the entire distance from the floor or bottom support. Such guard shall be constructed of wood or metal, and shall extend to at least one-half ( $\frac{1}{2}$ ) the height of the counterweight,



when it is at its highest position; other equally effective devices may be used. This rule shall not apply to governor counterweights, and all other kinds of counterweights of less than ten (10) pounds weight, when the bottom of the weight at the highest point of its travel is eight (8) feet or less from the floor.

*Rule 2. Counterweights on Rods or Levers: Class A.*

Counterweights on rods or levers shall be secured thereto to prevent them from falling. A pin or piece welded or riveted to the rod which carries the counterweight shall be provided to form a stop. Auxiliary chains or cables shall be used where counterweights are in a location where they constitute a hazard to employees.

## SEC. 14. FANS

*Rule 1. Fans: Class A.*

Fan blades on any fan exposed to contact, in regular course of employment, shall be guarded with a substantial wire mesh screen. If such guard is within 4 inches of the impellor, the opening of the guard shall not permit the insertion of a  $\frac{1}{2}$  inch ball. If further away than 4 inches, the opening in the guard shall not permit the insertion of a  $1\frac{1}{2}$  inch ball.

## CHAPTER 4. ELECTRICAL INSTALLATIONS

*Rule 1. Electrical Installations: Class A.*

All electrical wiring, switches, motors and other electrical equipment shall be of a safe type and installed in a safe manner to prevent injury to employees. Compliance in this respect with the National Electrical Code of the National Fire Protection Association shall be deemed as compliance by the employers with this rule.

*Rule 2. Grounding of Equipment in Contact with Electrical Circuits: Class A.*

All stationary equipment which is electrically operated and the electrical equipment is attached to or is a part of the equipment operated, or where electric heating units are incorporated in the equipment, or where lighting circuits are attached to the equipment, or where there are any other types of electrical connections to the equipment operated, shall be electrically bonded and permanently and effectively grounded to an underground water piping system or equivalent grounding electrodes (1) if the equipment to be operated is located on wet or damp ground or floors; (2) if the equipment is within 7 feet of any metal part of the building structure, piping system or metallic building equipment; (3) if the equipment uses or contains liquids with a water base in which the operators have to work.

## CHAPTER 5. STEAM INSTALLATIONS

*Rule 1. Steam Pipes and Steam Heated Equipment: Class A.*

All steam pipes or steam heated equipment except such heated surfaces that are exposed for the purpose of operation in connection with heat processes or such steam pipes and heated surfaces pertaining to a building heating system shall be guarded when so located that employees may come in contact with the hot surfaces in their regular course of employment, and shall be covered with an insulation material of such quality and thickness that the outer surface of the insulating cover does not exceed 170 degrees Fahrenheit surface temperature; or such surfaces shall be so guarded by enclosures that the employees shall not come in contact with the hot surfaces. This requirement shall not include valves, fittings or accessories that must necessarily remain exposed for the proper functioning or control of the steam heated process or system.

*Rule 2. Shut-Off Valves: Class A.*

All steam or hot water supply to any equipment except building heating systems, shall be provided with a shut-off valve either manually or automatically operated, serving each equipment, and such valve equipment shall be conveniently located with respect to the individual equipment supplied with steam or hot water so that in case of failure of the steam or hot water system on the equipment, the supply can be readily shut off. Such valves shall be of a type that is capable of withstanding the maximum pressure on the line.

## CHAPTER 6. MISCELLANEOUS

*Rule 1. First Aid: Class A.*

In a plant where there is no regularly equipped plant dispensary manned by trained personnel, or where regular first aid service is not immediately available in the neighborhood, a standard first aid kit with dressings for first aid treatment of minor wounds shall be provided. The contents of this kit shall be kept in a sterile, usable condition, and replenished whenever necessary. Any one treating such wounds, however, shall be trained in the fundamentals of first aid.

Such first aid equipment shall be kept in a designated accessible place, free from dust and dirt.

## PART "C"

Effective July 15, 1938

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## PART "C"

### RULES RELATING TO REMOVAL OF DUSTS, VAPORS, FUMES OR GASES FROM GRINDING, POLISHING AND BUFFING OPERATIONS

#### CHAPTER I

#### SCOPE AND DEFINITIONS

##### SEC. 1. SCOPE AND DEFINITIONS

*Rule 1. Scope:* These rules shall apply where grinding, polishing, buffing, scratch brushing or abrasive cutting-off wheels, grinding and polishing straps or belts are used, and the dusts, vapors, gases or fumes generated thereby constitute a hazard to the health of the employees engaged in or about any such operations; provided, however, that the rules contained in this Part "C" shall not apply to the following:

(a) Grinding machines upon which a liquid is used at the area of grinding contact, or any other abrasive grinding, polishing or honing operations in which a liquid is used to prevent the escape of dust and particles given off by the operations;

(b) Intricate and precision grinding of parts where the grinding pencils, discs or wheels are not over one inch in outside diameter;

(c) The grinding and polishing of jewelry and instruments made from solid gold, silver or platinum;

(d) The internal grinding of dies;

(e) Portable grinders and polishers;

(f) The operation of grinding or scratch brushing wheels and discs not over 20" in diameter for occasional work when performed in a room, compartment, or work place of not less than 200 square feet in floor area and having a ceiling height of not less than ten feet, and the operation upon all such grinding or scratch brushing wheels or disc shall not exceed the equivalent of the operation of one such grinder in such room, compartment or work place for a period of not more than two hours out of every eight consecutive hours; provided, however, that in larger rooms, compartments, or work places every separate floor area of 5,000 square feet and having a ceiling height of not less than ten feet, shall be con-

sidered a separate room, compartment, or work place for the purpose of this exemption;

(g) The operation of polishing and buffing wheels for occasional work when performed in a room, compartment, or work place of not less than 200 square feet in floor area and having a ceiling height of not less than ten feet, and the operation upon all such polishing or buffing wheels shall not exceed the equivalent of the operation of one such polisher or buffer in such room, compartment, or work place for a period of not more than two hours out of every eight consecutive hours.

*Rule 2. Definitions:*

The following definitions shall apply in connection with rules contained in this Part "C".

*Grinding Wheels.* Grinding wheels shall mean all power driven, rotatable, grinding or abrasive wheels except disc wheels as hereinafter defined, consisting of abrasive particles held together by artificial or natural mineral or organic bonds and used for grinding purposes.

*Disc Wheels.* Disc wheels shall mean all power driven, rotatable discs faced with abrasive materials. Such disc facings may be textile fabric or paper coated with abrasive particles or may be abrasive held together by artificial or natural mineral or organic bonds and used for grinding or polishing.

*Polishing and Buffing Wheels.* Polishing and buffing wheels shall mean all power driven rotatable wheels composed all or in part of textile fabrics, wood, felt, leather, paper, etc., and may be coated with abrasives and used for polishing, buffing and light grinding purposes on the periphery of the wheel.

*Scratch Brush Wheels.* Scratch brush wheels shall mean all power driven rotatable wheels made from wire, bristles, etc., and used for scratch cleaning and brushing purposes.

*Straps and Belts.* Straps and belts shall mean all power driven, flexible, coated bands used for grinding, polishing or buffing purposes.

*Abrasive Cutting-Off Wheels.* Abrasive cutting-off wheels shall mean all power driven, rotatable organic bonded wheels, the thickness of which is not more than  $1/48$  of their diameter for those up to 20 in. in diameter, and not more than  $1/60$  of their diameter over 20 in. in diameter, and used for cutting-off, grooving, slotting, coping, jointing, etc.

*Cradle.* Cradle shall mean a counter-balanced movable fixture, which is usually hung or supported at a point in back of an enclosure with the front end terminating in handle bars or other means so that the operator can manipulate the fixture upon which the part to be ground or polished is placed under the grinding or polishing wheel.

*Hood.* Hood shall mean the structure or partial enclosure through which air enters an exhaust system during operation.

*Swing Frame Grinder.* Swing frame grinder shall mean any power driven, rotatable, grinding, polishing or buffing wheel mounted in a framework that is hung or supported in such a manner that the wheel with its supporting framework can be manipulated over stationary objects for grinding, polishing or buffing purposes.

*Portable Grinder.* Portable grinder shall mean any power driven, rotatable, grinding, polishing or buffing wheels where the grinders are sufficiently light in weight to be manually handled or counter-balanced and manually manipulated in the grinding, polishing or buffing operations.

*Horizontal Single Spindle Disc Grinder.* A single spindle disc grinder shall mean a grinding machine carrying an abrasive disc wheel upon one or both ends of a power driven, rotatable single horizontal spindle.

*Horizontal Double Spindle Disc Grinder.* A double spindle disc grinder shall mean a grinding machine carrying two power driven rotatable, coaxial, horizontal spindles upon the inside ends of which are mounted abrasive disc wheels used for grinding two surfaces simultaneously.

*Vertical Spindle Disc Grinder.* A vertical spindle disc grinder shall mean a grinding machine having a vertical, rotatable power driven spindle carrying a horizontal, abrasive disc wheel.

*Exhaust System.* An exhaust system shall mean a system of branch pipes connected to hoods or enclosures, one or more headers, an exhaust fan and discharge stack where required and means for separating entrained dust and dirt from the air flowing in the system.

*Header Pipe.* A header pipe shall mean a pipe into which one or more branch pipes enter and which connects such branch pipes to the exhaust system.

*Branch Pipe.* Branch pipe shall mean that part of an exhaust system which connects a hood or an enclosure to the header pipe.

*Pitot Tube.* A pitot tube shall mean a velocity pressure indicating instrument consisting of an impact tube within an outer or static pressure tube. The static pressure tube shall have not less than four 0.02 in. diameter static holes on at least two sides located not less than 8 tube diameters from the upstream or impact end of the tube and an equal distance from the elbow or bend of the tube. The end opposite the impact end shall terminate in connections to be attached to a manometer gauge.

*Velocity Pressure.* Velocity pressure shall mean the pressure required to accelerate air from a state of rest to the particular velocity required.



## CHAPTER 2

### EXHAUST SYSTEMS

#### SEC. 1. INSTALLATION AND OPERATION OF EXHAUST SYSTEMS, INCLUDING DESIGN, SPECIFICATIONS, AND TESTING THEREOF.

##### *Rule 1. Requirements for installation and operation of Exhaust Systems:*

(a) Where grinding, polishing, buffing, scratch brushing or abrasive cutting-off wheels, grinding and polishing straps or belts are used, there shall be provided in the area where dusts, vapors, gases or fumes are generated, hoods that are connected to exhaust systems which will remove such dusts, vapors, gases or fumes, and such exhaust systems shall be operated continuously during any such operations on aforesaid equipment and such exhaust systems shall be provided with dust arresters, collectors, or precipitators to collect the dust before the air or gases from such exhaust systems are discharged therefrom.

(b) Exhaust systems shall discharge out of doors; provided, however, that where an exhaust system washes, scrubs or filters the exhausted air of dusts, vapors, gases or fumes, such air may be discharged indoors if same does not constitute a hazard to the health of the employees.

##### *Rule 2. Design of Exhaust Systems:*

(a) All branch pipes shall enter the header pipe at an angle of forty-five degrees or less. All bends, turns or elbows used in exhaust pipes shall be made with a throat radius of two pipe diameters except greater or smaller throat radii may be used to clear obstructions.

(b) All branch pipes shall connect with a header pipe. The area of the header pipe at any point shall not be less than the combined areas of the branch pipes joining it between such point and the small end of the header. Such header pipes shall be connected to an exhaust fan to produce a minimum air velocity in the branch pipes of 4,500 feet per minute or such greater air velocity reasonably required to remove dusts, vapors, gases or fumes generated if same constitute a hazard to the health of employees. Where cradles are used for handling the parts to be ground, polished or buffed, or where swing grinders are used, and large partial enclosures to house the complete operation are required, the opening in such enclosures shall have a minimum average air velocity of 100 feet per minute and shall be connected to branch pipes of an exhaust system of such area as to produce a minimum air velocity of 2,000 feet per minute in the branch pipes.

*Rule 3. Hoods and Branch Pipes for Exhaust Systems:*

(a) Hoods connected to exhaust systems shall be used and such hoods shall be so designed, located and placed that the dust or dirt particles will fall or be projected or drawn into the hoods in the direction of the air flow. No wheels, discs, straps, or belts shall be operated in such manner and in such direction that will cause the dust and dirt particles to be thrown into the operators breathing zone.

(b) The exhaust outlet of the hoods and the branch pipes connected thereto, of grinding wheels on floor stands, pedestals, benches, swing frames, and special purpose grinding machines and abrasive cutting-off wheels shall have not less than the following minimum inside diameter.

Size of grinding or abrasive cutting-off wheel inches	Minimum inside diameter of hood outlet and branch pipe inches	Maximum Wheel Surface (Sq. inches)
Up to 9" dia. incl. not over 1½" thick. ....	3"	43
Over 9" to 16" dia. incl. not over 2" thick	4"	101
Over 16" to 19" dia. incl. not over 3" thick	4½"	180
Over 19" to 24" dia. incl. not over 4" thick	5"	302
Over 24" to 30" dia. incl. not over 5" thick	6"	472
Over 30" to 36" dia. incl. not over 6" thick	7"	679

(c) The exhaust outlet in the hood and branch pipes connected thereto of brush wheels over 6" in diameter and all buffing and polishing wheels mounted on floor stands, pedestals, benches or special purpose machines shall have not less than the following minimum inside diameter:

Size of buffing, polishing and scratch brush wheel inches	Minimum inside diameter of hood outlet and branch pipe inches	Maximum Wheel Surface (Sq. inches)
Up to 9" dia. incl. not over 2" thick. ....	3½"	57
Over 9" dia. to 16" dia. incl. not over 3" thick .....	4½"	151
Over 16" dia. to 19" dia. incl. not over 4" thick .....	5"	239
Over 19" dia. to 24" dia. incl. not over 5" thick .....	5½"	377
Over 24" dia. to 30" dia. incl. not over 6" thick .....	6½"	565

(d) In case a grinding, polishing, buffing or scratch brushing wheel is thicker than given in the tables set out herein, the diameter of the hood outlet and branch pipe connected thereto shall not be less than called for by its wheel surface.

When the grinding, polishing, buffing or scratch brushing wheel surface exceeds 679 square inches, the inside area of the hood outlet and branch pipe connected thereto shall be increased in size in the ratio of one square inch of opening to 17 square inches of wheel surface.

(e) Grinding wheels or discs for horizontal single spindle disc grinders shall be hooded to collect the dust or dirt generated by the grinding operation and the hoods shall be connected to branch pipes of the following minimum diameters:

Size of wheel or disc inches	Minimum inside diameter of hood outlet and branch pipe inches
Up to 12" diameter.....	3"
Over 12" to 19" diameter inclusive.....	4"
Over 19 to 30" diameter inclusive.....	5"
Over 30" to 36" diameter inclusive.....	6"

(f) Grinding wheels or discs for double spindle disc grinders shall have a hood enclosing the grinding chamber and such hood shall be connected to one or more branch pipes of the following minimum diameters:

Size of wheel or disc inches	Minimum Number and inside diameter of hood outlet and branch pipe inches
Up to 19" diameter inclusive.....	1 pipe —5"
Over 19" dia. to 25" dia. inclusive.....	1 pipe —6"
Over 25" dia. to 30" dia. inclusive.....	1 pipe —7"
Over 30" dia. to 53" dia. inclusive.....	2 pipes—6"
Over 53" dia. to 72" dia. inclusive.....	4 pipes—8"

(g) Grinding wheels or discs for vertical single spindle disc grinders shall be encircled with a hood to remove the dust generated in the operation and such hoods shall be connected to one or more branch pipes of the following minimum inside diameters:

Size of disc inches	Minimum number and inside diameter of hood outlet and branch pipe inches
Up to 20" diameter.....	1 pipe —4½"
Over 20" dia. to 30" dia. inclusive.....	2 pipes—4"
Over 30" dia. to 53" dia. inclusive.....	2 pipes—6"
Over 53" dia. to 72" dia. inclusive.....	2 pipes—8"

(h) Grinding and polishing straps and belts shall be provided with hoods to remove dust or dirt generated in the operation and such hoods shall be connected to branch pipes of the following minimum inside diameters:

Strap or belt size inches	Minimum inside diameter of hood outlet and branch pipe inches
Up to 3" wide.....	3"
Over 3" wide.....	For each 2" or fraction thereof increase in strap or belt width add ½" or fraction thereof to the hood outlet and branch pipe size.



The above sizes of inside diameter of hood outlets and branch pipes shall apply to all new installations of hood outlets and branch pipes after these Rules become effective.

(i) The Rules in this Part "C" shall not apply to exhaust systems in operation at the time these Rules become effective where the hood outlet and branch pipe diameter are not less than 80 per cent of the diameter required for new installations.

*Rule 4. Testing of Exhaust Systems:*

A Pitot tube shall be used to measure the velocity pressure of the air flow in the branch pipes and such measurements must be taken in the center of a straight portion of the branch pipe near the hood at a point that is ten pipe diameters away from an elbow or bend or as near this location as the branch pipe installation will permit and the velocity pressure shall not be less than 1.53 inches of water for 4,500 foot velocity per minute and 0.31 inches of water for 2,000 foot velocity per minute as indicated in a "U" shaped tube.

All tests for air velocity shall be made with all branch pipes and hoods of the exhaust system fully open at the same time.

## PART "D"

Effective November 1, 1939

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## PART "D"

### RULES RELATING TO CONSTRUCTION OF UNDERGROUND TUNNELS, WHETHER OR NOT SUCH CONSTRUCTION IS UNDER COMPRESSED AIR EXCEPT AS HEREINAFTER STATED

#### CHAPTER I

#### PART I

#### SCOPE AND DEFINITIONS

##### SEC. 1. SCOPE AND DEFINITIONS

*Rule 1. Scope:* These rules under Part I shall apply to the construction of underground tunnels whether or not such construction is under compressed air except as hereinafter stated. The rules under Part II shall apply to all work under compressed air but shall not be construed to be exclusive of the rules under Part I, except that in the case of direct conflict with such rules, the rules under Part II shall apply.

*Rule 2. Definitions:* The following definitions shall apply in connection with rules contained in this Part "D":

(a) *Blaster* shall mean any person designated by the Superintendent to supervise blasting operations who shall be charged with the responsibility of properly thawing explosives, preparing and fixing charges, firing, and approaching misfires.

(b) *Bulkhead* shall mean a longitudinal or transverse partition separating the tunnel into sections or chambers.

(c) *Caisson* shall mean a wood, steel, concrete or reinforced concrete air and water-tight chamber in which it is possible for men to work to excavate material.

(d) *Constructor* shall mean the person, firm or corporation in immediate control of the construction of any tunnel or its accessories, and as such responsible for the condition and management thereof.

(e) *Employees or Persons Employed* shall mean all persons receiving compensation from the Constructor or others for labor or services performed on the works.

(f) *Explosive* shall mean any chemical compound or any mixture that contains any oxidizing and combustible units or other ingredients in such proportions, quantities or packing that an ignition by fire, by friction, by concussion, by percussion or by detonation of any part of the compound or mixture may cause a sudden generation of highly heated gases that the resultant pressures are capable of producing destructive effects on contiguous objects or of destroying life and limb.

(g) *Foreman* shall mean a person in charge of a subdivision of the work or of the entire work at any one time and under the instructions of the Superintendent.

(h) *Grounding* shall mean so connecting any part of an electrical system to the earth that there shall be no material difference of potential between such part and the earth.

(i) *Guarded—Encased—Enclosed* shall mean that the object is so covered, fenced or surrounded that contact, which may result in injury, at the point of danger is remote.

(j) *Lock* shall mean a chamber designed to facilitate the passage of men and materials from an air pressure greater than normal, as in a compartment, caisson or tunnel, to the ground or water level or normal air pressure.

(k) *Emergency Lock* shall mean a lock designed to hold and permit the passage of an entire shift in each heading.

(l) *Medical Lock* shall mean a lock to which men suffering from compressed air diseases (bends) may be removed for medical attention.

(m) *Magazine* shall mean any building or other structure or place in which explosives are stored or kept, whether above or below ground.

(n) *Potential* and *Voltage* are synonymous and shall mean electrical pressure.

(o) *Potential of a Circuit* shall mean potential normally existing between the conductors of such circuit or the terminals of such machines or apparatus.

(p) *Difference of Potential* shall mean the difference of electrical pressure existing between any two points of an electrical system or between any point of such a system and the earth as determined by a voltmeter.

(q) *Pressure* shall mean gauge air pressure per square inch.

(r) *Shaft* shall mean an excavation made from the surface of the ground, the longer axis of which is steeper than forty-five (45) degrees with the horizontal.

(s) *Shafting* shall mean an air and water-tight shaft built in the roof of the caisson and extended upward until above the normal water level.

(t) *Superintendent* shall mean the person resident on the work having general supervision and responsibility.

(u) *Tunnel* shall mean a subterranean passage or chamber.

(v) *Tunnel Heading* shall mean that section of a tunnel where excavation work for driving the tunnel is being carried on.

(w) *Underground* shall mean within the limits of any shaft or tunnel.

(x) *Low Voltage Supply* shall mean the supply of electricity where the difference of potential between any two points of the circuit cannot exceed three hundred (300) volts.

(y) *Medium Voltage Supply* shall mean the supply of electricity where the difference of potential between any two points of the circuit may at any time exceed three hundred (300) volts, but shall not exceed six hundred and fifty (650) volts.

(z) *High Voltage Supply* shall mean the supply of electricity where the difference of potential between any two points of the circuit may at any time exceed six hundred and fifty (650) volts.

(aa) *Works* shall mean any or all parts of a tunnel excavated or being excavated as well as shafts and approaches, power houses, lumber yards, storage yards and structures of all kinds, which are in the immediate vicinity of and used in connection with the excavation or the immediate disposal of excavated material or in connection with the construction of the tunnel lining.



## PART II

### WORK IN COMPRESSED AIR

#### *Rule 1. Communication:*

(a) Suitable means of communication shall be maintained at all times between the working chamber and the power house and the surface, and wherever possible, telephones shall be installed.

#### *Rule 2. Ventilation:*

(a) The supply of fresh air to the working chamber shall be sufficient at all times to permit work to be done without danger or discomfort. All air supply lines shall be equipped with check valves and carried as near to the face as practicable. The air shall be analyzed by the Constructor as required and a record kept of the same.

(b) Exhaust valves shall be provided, having risers extending to the upper part of chamber, if necessary, and shall be operated at such times as may be required and especially after a blast, and men shall not be required to resume work after a blast until the gas and smoke have cleared.

#### *Rule 3. Equipment:*

(a) Every employer of persons for work in compressed air shall:

(1) Connect at least two air pipes with the working chamber and keep such pipes in perfect working condition;

(2) Attach to the working chamber in accessible positions all instruments necessary to show its pressure and keep such instruments in charge of competent persons, with a period of duty for each person, not exceeding eight hours in any twenty-four; and where the air pressure is more than fifteen pounds per square inch, when practical to do so, a recording gauge to show the rate of decompression shall be attached to the exterior of each man lock. The dial on such lock shall be of such size that the amount of rise or fall in the air pressure within any five minutes shall be readily shown.

(3) Establish and maintain a medical lock properly heated, lighted, ventilated and supplied with medicines

and surgical implements when the air pressure exceeds fifteen pounds per square inch; such lock shall be not less than six (6) feet in diameter (except when Oxygen, Helium, or similar gases are used for treatment) and shall be divided into two compartments. Each door shall be provided with a "bulls eye" fitted with air valve so arranged to be operated from within and without. Such lock shall contain a gauge, a telephone and cot. Such lock shall be under the control of a physician in charge and there shall be maintained in close proximity a first-aid room, which shall contain a bath tub and all medical and surgical appliances necessary for first aid in case of accident.

(4) Establish and maintain an emergency lock and exit to the surface of the ground near each heading. Emergency locks shall be large enough to allow the exit of all men in the heading at any time.

(5) The main lock shall be large enough so that those using it are not in a cramped position, and shall not be less than six feet in height;

(6) All locks used for decompression shall be lighted by electricity and shall contain a pressure gauge, a time-piece, a glass "bulls eye" in each door or in each end;

(7) Valves shall be so arranged that the locks can be operated both from within and from without;

(8) When locking explosives and detonators into the air chamber, they shall be kept at opposite ends of the lock. While explosives and detonators are being taken through, no men other than the lock tender and the carrier shall be permitted in the lock;

(9) A good and sufficient compressor plant for the compression of air shall be provided to meet not only ordinary conditions, but emergencies, and to provide margin for repairs at all times. Provision shall be made for storing in tanks at each boiler house enough feed water for twelve hours' supply, unless connection can be made with two independent and separately sufficient sources of supply.

(10) This plant shall be capable of furnishing to each working chamber a sufficient air supply for all pressures to enable work to be done as nearly as possible in the dry;

(11) When electric power is used for running compressors supplying air for compressed air tunnel work the following provisions shall be complied with:

A. There shall be two or more sources of power from the power stations to the compressor plant. Such power feeders shall each have a capacity large enough to carry the entire compressor plant load and normal over load. The feeders shall preferably run from sep-

arate generating plants of sub-stations and be carried to the compressor plant over separate routes and not through the same duct lines and manholes, so that the breakdown of one feeder shall not cause an interruption on the other feeder;

B. There shall be duplicate feeder bus-bars, and feeder connections to the bus-bars shall be such that either feeder can feed to each separate bus-bar set, individually, or simultaneously to both sets.

C. There shall be at least two compressors so connected to the bus-bar that they can be operated from either set of busses. The compressors shall be fed from different bus-bar sets, in such a way that a break-down of a feeder or bus-bar would interrupt the operation of only part of the compressor plant;

D. Duplicate air feed pipes shall be provided from the compressor plant to a point beyond the lock.

*Rule 4. Medical Attendance and Regulations and Examinations:*

(a) Whenever work is being carried on in compressed air, when the air pressure exceeds fifteen pounds per square inch, the Constructor shall employ one or more duly licensed physicians, who shall be in attendance at all times while the work is being carried on, and whose duty it shall be to strictly enforce the following:

(1) No person shall be permitted to work in compressed air before he shall have been examined by the physician and reported to the person in charge thereof to be physically fit to engage in such work;

(2) In the event of absence from work of any employee for ten or more successive days for any cause, he shall not resume work until he shall have been re-examined by the physician and his physical condition reported to be such as to permit him to work in compressed air.

(3) No person known to be addicted to the excessive use of intoxicants shall be permitted to work in compressed air;

(4) No person not having previously worked in compressed air shall be permitted to work in a pressure exceeding seventeen pounds without having first been tested by the physician in the medical lock, nor shall any such person be permitted to work under any pressure for longer than one-half of a day period until he shall have been re-examined by the physician and found to be physically fit for such work;

(5) After a person has been employed continuously in compressed air for a period of two months, he shall be



re-examined by the physician and he shall not be permitted to work until such re-examination has been made and he has been reported as physically qualified to engage in compressed air work;

(6) The physician shall at all times keep a complete and full record of examinations made by him, which record shall contain dates on which examinations were made and a clear and full description of the persons examined, his age and physical condition at the time examined, also a statement as to the time such person has been engaged in like employment. A uniform examination blank, which shall contain the record of examination in every case of compressed air workers, shall be used by each medical examiner and the record of such examinations shall be kept on file at the place where the work is in progress and shall be subject to inspection by the Department of Labor.

(7) Where the air pressure exceeds fifteen pounds per square inch an identification badge shall be furnished to all employees working in compressed air, individually numbered. Such badge shall advise police officers that the employee is a compressed air worker, stating location of medical lock, and stating that in case of emergency the man shall be removed to the medical lock and not to a hospital or to a police station.

## CHAPTER 2

### PART I

#### CONSTRUCTION OF UNDERGROUND TUNNELS

##### *Rule 1. Fire Prevention:*

(a) All shafts, slopes and tunnels shall be lined with fireproof materials.

(b) It shall be the duty of the constructor of every tunnel in which oils and other dangerous inflammable materials are used, to store such materials, or cause them to be stored, in a covered building kept solely for such storage, which building shall be at least one hundred (100) feet from any shaft, tunnel or approaches, or any building directly connected with a tunnel opening, and at least three hundred (300) feet from any power magazine; provided, that gasoline, naphtha, distillate and fuel oils may be stored in a tank or tanks buried in the ground, which tank or tanks shall be provided with proper vents and shall be placed at least fifty (50) feet from any shaft, tunnel or approaches, or any building directly connected with a tunnel opening, and at least three hundred (300) feet from any powder magazine; and provided further, that lubricating oils may be stored in a well constructed covered building, which shall be at least fifty (50) feet from any shaft, tunnel or approaches, or any building directly connected with a tunnel opening. No tank shall be installed from which fuel oil is to be conducted by gravity to the point of combustion, unless such tank shall be so located that escaping oil cannot run over the surface from such tank to any building within one hundred (100) feet of any tunnel opening.

(c) The person in charge of such building or tank or tanks, who shall be the superintendent or a person expressly designated by him, shall permit only sufficient oil or other inflammable materials to be taken from such building or tank or tanks to meet the requirements of paragraph (e) of this Rule. If any oil or gasoline storage be so situated that leakage would permit the oil or gasoline to flow within the above specified distances, means to prevent such flow must be provided.

(d) Oil for illumination or power shall not be taken into the underground workings of any tunnel or kept therein in quantities greater than necessary to afford one day's supply.

(e) The storage of gasoline, naphtha and other distillates underground is prohibited; provided, however, that a supply sufficient for one day's operation of blow torches, fuel burning engines or locomotives may be kept in the tank or tanks attached to such equipment.

(f) Smoking or the use of unprotected lights shall be prohibited any place where there is danger of igniting explosives, oils, fumes, dust, gases or other combustible material, and notices shall be posted to this effect.

(g) No gasoline or other internal combustion engines shall be used in tunnel or shaft.

(h) No storage batteries used in any tunnel shall be charged in the tunnel.

(i) The Constructor shall place a sufficient number of fire extinguishers, of at least 5 gallon capacity, or a type approved by the Underwriters' Laboratory, in all buildings, at top and bottom of shaft, and shall keep at least 1 extinguisher mounted on tunnel walls at a point not over 150 feet from each heading at all times.

(j) The Constructor shall provide adequate standard fire hose connections on a water line on the tunnel plant site and equip each with at least 100 feet of fire hose and nozzle, racked in a manner to be readily accessible.

(k) A diagram of any tunnel, showing all special features and easily legible, shall be mounted in a glass covered frame near the top of each shaft.

(l) Waste or decayed timber shall not be stored in the tunnel, but shall be promptly removed therefrom. Empty boxes, wooden chips, paper and combustible rubbish of all kinds shall not be allowed to accumulate underground.

## *Rule 2. Lighting:*

(a) All tunnels and shafts shall be lighted with a sufficient number of electric lights to insure proper work and inspection.

(b) The exterior of all lamp sockets shall be entirely non-metallic.

(c) All portable incandescent lamps used shall be guarded by a wire cage large enough to enclose both lamp and socket.

(d) All incandescent lamps shall be so placed that they cannot come in contact with any combustible material, and so that an adequate circulation of air may be taken in on all sides of them.

(e) Only heavy insulated or armored wire shall be used for light or power.



(f) While work is in progress, tunnels, stairways, ladderways and all places on the surface where work is being conducted shall be properly lighted.

(g) All places where hoisting, pumping or other machinery is erected and in the proximity of which persons are working or moving about, shall be so lighted when the machine is in operation that the moving parts of such machine can be clearly distinguished.

(h) Lamp cord, when used for temporary lighting connections, shall be extra heavy insulation. Single portable lights shall be protected by a wire cage large enough to enclose both lamp and socket, and shall be provided with a handle to which the light and socket shall be firmly attached and through which the lead-in wires shall be carried.

### *Rule 3. Ventilation:*

(a) The Constructor of every shaft or tunnel shall provide and maintain for every such shaft or tunnel a good and sufficient amount of ventilation for such men as may be employed therein, and shall cause an adequate quantity of pure air to circulate throughout the working places of such shaft or tunnel.

(b) The air for compressors shall be drawn from pure outside sources, the inlets being at least twenty (20) feet above the surface of the ground, care being taken to keep air free from smoke, lubricating oil and other impurities.

### *Rule 4. Sanitation:*

(a) It shall be the duty of the Constructor of every tunnel, for the purpose of improving the sanitation thereof and preserving the health of those employed therein, to provide dry closets, water closets, chemical closets or closet cars upon all main working levels for the use of all men employed in the tunnel. At least one such closet shall be provided for every twenty-five (25) men employed within the tunnel. Ready means of access to each such closet shall be provided by the Constructor. No closet shall be constructed without adequate provision for the effectual cleansing and removing of the contents thereof, which shall be removed and disposed of at least twice a week. It shall be the duty of the tunnel foreman to cause each dry closet to be supplied with some disinfectant or deodorizer to be sprinkled upon the contents thereof. All men employed within the tunnel shall be required to use such closets exclusively when in the tunnel; provided, however, that this rule shall not apply to any tunnel where the Constructor or Superintendent prefers to permit the men to go to the surface and requires the men so to do.

(b) It shall also be the duty of the Constructor of every tunnel to provide a sufficient quantity of good drinking water for the use of all men employed in the tunnel, a supply of

which shall be provided on each main working level, and it shall be the further duty of the Superintendent to cause such supply of drinking water to be adequately protected from contamination.

(c) The Constructor of every tunnel employing more than twenty-five (25) men underground shall provide a wash and change house. Such wash and change house shall be adequately heated and lighted and shall contain a sufficient supply of running water, hot and cold showers, washbowls and lockers.

(d) A locker room shall be provided for the use of the workers.

(e) The locker room mentioned above shall have facilities for the drying of working clothes and shall be well heated.

(f) One toilet and one urinal shall be provided for every twenty men employed on each shift.

(g) A minimum temperature of seventy degrees Fahrenheit shall be maintained at all times in wash and dressing rooms.

(h) Sufficient hot coffee and sugar shall be supplied to men working in compressed air, when the air pressure exceeds fifteen pounds per square inch, at the termination of shifts and during rest periods. Coffee must be heated by means other than direct steam. Coffee containers and cups shall be kept in a clean, sanitary condition at all times. All containers shall be kept covered at all times.

(i) Care shall be taken to keep all parts of tunnel, caissons and other working compartments, including lockers, dry-rooms, rest rooms and other equipment in a sanitary condition and free from refuse, decaying or other objectionable matter.

#### *Rule 5. Signals and Means of Communication:*

(a) Effective and reliable signalling devices shall be maintained at all times to give instant communication between the bottom and top of the shaft.

(b) Any code of signals used shall be printed in copies thereof in such languages as may be necessary to be understood by all persons affected thereby, shall be kept posted in a conspicuous place near entrances to work places, and in such other places as may be necessary to bring them to the attention of all persons affected thereby.

(c) A telephone system shall be established and maintained, communicating with the surface at each shaft, and with a station or stations readily and quickly accessible to the men at the working level.

#### *Rule 6. Hoisting:*

(a) The Superintendent of the tunnel shall determine the maximum number of men that in his judgment may safely ride on each cage, skip, bucket or other conveyance used in the

tunnel under his supervision, and shall post in a conspicuous place near each shaft a notice stating the maximum number of persons so permitted to rise and forbidding the carrying of any greater number.

(b) At all times when hoisting or lowering is being done, there shall be one cage tender on duty who shall prevent overloading of men on cages, skips, buckets or other conveyances used in the shaft.

(c) All ropes used for hoisting or lowering men shall be thoroughly inspected once in every week by some competent person designated for the purpose by the Superintendent.

(d) Every rope used for hoisting or lowering men shall be securely fastened at both ends, and when in use shall never be fully unwound; at least two (2) full turns shall remain always on the drum or reel. The end of the rope attached to the conveyance in the shaft shall be bound around an oval thimble and then fastened to itself by the use of three or more clamps or shall be securely fastened within a tapered socket.

(e) Proper means to prevent overwinding shall be provided.

(f) There shall be installed in every shaft where men are hoisted a device which shall indicate or give a warning signal in the engine room whenever the cage, skip or bucket in ascending or descending reaches a certain point below or above the limit of travel of the cage, skip or bucket, such point to be determined by local conditions.

(g) In all shafts where men are hoisted or lowered, an iron-bonneted cage shall be used for the conveyance of men, but this provision shall not apply to shafts in the process of sinking or during the dismantling of the shaft after work in the tunnel is substantially completed.

(h) Man hoist cages shall be provided with bonnets consisting of two (2) steel plates not less than three-sixteenths ( $3/16$ ) of an inch in thickness, sloping toward each side so arranged that they may be readily pushed upward to afford egress to persons therein, and such bonnet shall cover the top of the cage in such manner as to protect persons on the cage from falling objects.

(i) Man hoist cages shall be entirely enclosed on two sides with solid partition or wire mesh not less than No. 8 U. S. gauge, no opening in which shall exceed two (2) inches.

(j) Every cage shall be provided with a proper safety catch of sufficient strength to hold the cage with its maximum load at any point in the shaft.

(k) A safety device shall be provided for blocking cars while on cage.

(l) All parts of the hoisting apparatus, cables, brakes, guides and fastenings shall be of the most substantial design and shall be arranged for convenient inspection. The efficiency



of all safety devices shall be established by satisfactory tests before the cages are put into service and at least once every three months thereafter and a record thereof kept.

(m) No employee shall be permitted to walk up or down any incline or shaft while any car, cage or bucket is above.

*Rule 7. Breasting, Lining and Sumps:*

(a) There must be at all times available near each heading sufficient breasting and bracing to secure the heading against soil movement.

(b) Lining shall be of adequate strength and properly designed to withstand loads imposed and permit of grouting. Special care shall be exercised to insure that full bearing is obtained between the lining and sheeting and the earth.

(c) All sumps shall be securely covered or fenced, except when being cleaned or repaired.

*Rule 8. Protection Against Atmospheric Contaminants:*

(a) Gas masks or equivalent devices of a type approved by the United States Bureau of Mines for every specific atmospheric contaminant shall be placed where they are readily accessible. Instruction in the use of the masks shall be given to all persons in charge of work and warning given not to enter the tunnel, in case of fire or evidence of gas, without the use of a gas mask.

(b) The Constructor shall provide equipment of the most modern and approved type for the detection of carbon monoxide, carbon dioxide, hydrogen sulphide and other dangerous gases in the tunnel. Gas tests shall be taken at least once each shift and oftener if necessary, and findings shall be recorded in a gas book provided for this purpose.

(c) The Constructor shall provide self contained oxygen breathing appliances of the mine rescue type approved by the United States Bureau of Mines. Each oxygen breathing appliance shall be of the 2 hour type and shall be installed in a metal cabinet, with a breakable glass door, together with a spare oxygen tank, permissible type flashlight and tools for adjusting the appliance. Not less than 5 appliances shall be provided near the top of each shaft at a convenient location. Appliances shall be inspected regularly and oxygen tanks kept filled to capacity so that they will be ready for immediate use at any time.

(d) Instruction in the use of the appliances shall be given to selected rescue squads of at least 7 men per shift for a minimum of 1 hour per week or oftener if necessary.

(e) The Constructor shall also provide, in each heading, a sufficient number of self-rescuers, of a type approved by the United States Bureau of Mines, to equip each man employed therein.

(f) Instruction in the use of the self-rescuers shall be given all employees on all shifts at least once a week.

*Rule 9. Electrical Equipment:*

(a) The frames and bed plates of generators, transformers, compensators, rheostats and motors installed underground shall be effectively grounded. All metallic coverings, armoring of cables, other than trailing cables, and the neutral wire of three-wire systems shall also be so grounded.

(b) In electrical systems hereafter installed, no higher voltage than low voltage shall be used underground, except for transmission or for application to transformers, motors, generators or other apparatus in which the whole of the medium or high voltage apparatus is stationary.

(c) Switchboards shall consist of a substantial framework of iron pipes, angle irons or bar-iron, on which shall be mounted a panel or panels of incombustible, non-absorbent insulating material that is mechanically strong and has insulating qualities suitable for the voltage at which it is used.

(d) The panels of insulating material may be omitted if each piece of equipment carried on the switchboard is provided with an individual base of insulating material of the character specified for the panels and of adequate dimensions, or has its current-carrying parts mounted on similar insulation self-contained in the equipment, which shall be especially designed for mounting on iron pipe, angle-iron or bar-iron frameworks.

(e) All medium and high voltage machines and apparatus shall be conspicuously marked by the use of the word "Danger" and shall be properly illuminated when in circuit.

(f) All high-voltage wires installed underground after these rules are adopted shall be in the form of insulated lead-covered cables, which shall be armored or effectively protected against abrasion, but the armor shall be electrically continuous throughout and shall be effectively grounded. The installation of efficiently insulated wires in metal conduit to transmit power underground shall be considered to meet this requirement.

(g) All underground cables and wires, unless provided with grounded metallic covering, shall be supported by efficient insulators. The conductors connecting lamps to the power supply shall be in all cases insulated.

(h) Cables and wires unprovided with metallic coverings shall not be fixed to walls or timbers by means of uninsulated fastenings.

(i) Overhead transmission lines between the generating station or substation and the tunnel entrance shall be supported upon insulators, which shall be adequate in quality, size and design for the voltage transmitted. Where such line is more than five hundred (500) feet in length, lightning arresters shall be installed in connection therewith. Such line, except in the case of trolley wires, shall be maintained not

less than ten (10) feet above the ground at the lowest point, except at the point of entrance to the tunnel.

(j) Buried cables shall be continuously insulated and protected by a metallic sheath, preferably lead; and where they are so located that there is a possibility of danger to the sheath by puncturing, such cables shall be further protected by armor.

(k) Every completely insulated feeder circuit in excess of twenty-four (24) kilowatt capacity leading underground, where the potential does not exceed the limits of medium-voltage potential, shall be provided above ground with a switch and an automatic overload circuit breaker. In the case of ground-return direct current circuits, a switch and current breaker shall be installed in the underground side of the circuit but may be omitted from the return side. Fuses may be substituted for circuit breakers in circuits.

(l) Every high-voltage alternating-current feeder circuit leading underground shall be provided above ground with an oil break switch on each phase and every such switch shall be equipped with an automatic overload trip.

(m) Every branch circuit shall be provided with a switch of ample carrying capacity on each phase within fifty (50) feet of the point where it leaves the main circuit.

(n) Trolley wires shall be installed as far to one side of the tunnel as is practicable and shall be securely supported and the supports efficiently insulated.

(o) At all places where men are required to work or pass regularly under trolley or other bare power wires which are placed less than six and one-half ( $6\frac{1}{2}$ ) feet above top of rail, a suitable protection shall be provided, which may consist of channeling of the roof or of placing boards along the wire, which shall extend three (3) inches below it, or in the use of any other device that will afford ample protection, at all points where timbers or tools have to be unloaded or transferred up a raise, the trolley wire shall be boxed or otherwise protected as provided for in this paragraph. All places where it is required that the trolley wires shall be boxed, shall be well lighted with electric lamps.

(p) In all shafts, the angle of inclination of which is above forty-five (45) degrees from the horizontal, and in all hoisting shafts or manway compartments, all power wires and cables shall be amply protected by insulation and substantially fixed in position. All shaft cables shall be supported on insulators that cannot cause abrasion of the covering or insulation, so spaced that no part of the cable shall be under a tension greater than one-fourth ( $\frac{1}{4}$ ) of its ultimate strength. The cable shall be held in position at points between the insulators by grips or cleats that cannot cause abrasion of the covering or insulation. Where the cables are not completely boxed in and protected from falling material, space shall be



left between them and the side of the shaft so that they may yield and lessen a blow from falling material. This rule shall not be construed to prevent the installation of efficiently insulated wire in metal conduit, to transmit power underground.

(q) Where the cables or feed wires in tunnels cannot be kept at least twelve (12) inches from any part of the tunnel car or locomotive, they shall be especially protected by proper guards.

(r) The exposed ends of cables where they enter fittings of any description shall be so protected and finished off that moisture cannot enter the cable or the insulating material leak out, if of an oily or viscuous nature.

(s) Where unarmored cables or wires pass through metal frames or into boxes or motor casings, the holes shall be substantially lined with insulated bushings.

(t) All joints in conductors shall be mechanically and electrically efficient and shall be soldered wherever necessary. All joints in insulated wire shall, after the joint is complete, be reinsulated to the same extent as the remainder of the wire.

(u) Where cables are joined, suitable junction boxes shall be used or the joints shall be soldered and the insulation, armoring or lead covering replaced in as good condition as it was originally.

(v) Fuses and automatic circuit breakers shall be constructed so effectually to interrupt the current when a short circuit occurs or when the current through them exceeds a predetermined value. No open type or link fuse shall be used.

(w) All points at which a circuit has to be made or broken shall be provided with suitable switches which shall be so installed that they cannot be closed by gravity.

(x) Fuses shall be stamped or marked, or shall have a label attached, indicating the maximum current that they are intended to carry. Fuses shall be adjusted or replaced only by an authorized and competent person.

(y) The capacity of fuses used to protect feeders shall not exceed the current capacity of the feeder by more than twenty-five (25) per cent.

(z) All switches, circuit breakers and fuses shall have non-combustible bases and shall be properly enclosed.

(aa) Safety switches shall be used for medium and high voltage.

(ab) Every motor underground, together with its starting device, shall be protected by a fuse in each phase or (in the case of motors of more than forty horse-power) by a circuit breaking device on at least one conductor of direct current motors and on each conductor of alternating current motors and by switches arranged to cut off entirely the power from the motor. The above devices shall be installed in a convenient position near the motor and in sight of it.

*Rule 10. Explosives:*

(a) When locking explosives and detonators into the air chamber, they shall be kept at opposite ends of the lock. While explosives and detonators are being taken through, no men other than the lock tender and the carrier shall be permitted in the lock.

(b) Only experienced men who have been selected shall be in charge and whose names have been posted in the field office or at the magazine shall handle, transport, prepare or use dynamite or other high explosives.

(c) The composition of explosives shall be such as to cause the least amount of injurious gases.

(d) All lights used when loading shall be of an enclosed type. If electric flash lamps are used, they shall be so constructed that it will not be possible to obtain a difference of potential between any two points on the outside of the lamp casing.

(e) No explosive shall be stored in any frame or wooden building or in any building within three hundred feet of a school house, church, hospital, theatre or hall licensed for public assemblies, or any public building.

(f) No matches shall be carried, kept or placed upon any premises in which explosives are stored, nor any smoking permitted thereon, nor any intoxicated persons, permitted to be or remain thereupon.

(g) All packages containing explosives during transportation shall be kept clean.

(h) Layers of blasting cartridges in packages shall be separated by sawdust or suitable inexplusive absorbent.

(i) No iron or steel shall be used in the construction of any such package, unless covered with zinc, tin or similar material.

(j) Each package, except smokeless powder, shall be marked by means of a brand or stencil, or a securely attached label with the words "Explosive—Dangerous" followed by the specific name of the explosive, the name and address of both the manufacturer and the forwarder, and a brief statement showing the weight of the package, the per cent of absorbent, and the date of manufacture.

(k) Explosives shall not be transported, carried, or conveyed in any dray, cart, wagon or other carriage in the streets, avenues, roads or highways, between the hours of sunrise and sunset.

(l) No matches shall be carried or used upon a vehicle engaged in the transportation of high explosives, nor any smoking permitted thereon, nor any intoxicated person permitted thereon, nor any unauthorized person allowed to be present during the loading or unloading of the same.

(m) No stops except unavoidable stops shall be made during the journey.

(n) No greater quantity of explosives than that which is required for immediate use shall be taken into the shaft or tunnel, except for storage in an approved underground magazine. Explosives when not in the original box shall be conveyed in a suitable covered wooden box painted red. Detonators shall be conveyed in a separate covered wooden box painted red with one-inch yellow stripe running horizontally entirely around the box. During transportation, explosives and detonators shall be kept not less than twenty-five (25) feet apart, unless transported in separate cars, in which case the distance between the explosives and detonators shall be not less than six (6) feet. Explosives and detonators shall not be taken down the shaft on the same cage at the same time. After blasting is completed all explosives and detonators shall be returned at once to the magazine, observing the same rules as when bringing them to work. Between firing rounds, the explosives and detonators shall be deposited separately on wooden platforms not less than twenty-five (25) feet apart and not less than six hundred (600) feet from the heading, on the side of the chamber opposite the electric light and power line, under the supervision of a competent man, or in the case of shafts, not less than fifty (50) feet from the outside of the opening.

(o) No tools or other articles shall be carried with the explosives or with the detonators.

(p) Detonators shall be inserted in the explosives only as required for each round of blasting. Detonators shall not be inserted in the explosives without first making a hole in the cartridge with a sharpened stick. No holes shall be loaded except those to be fired at the next round of blasting. All explosives remaining after loading a round shall be removed from the heading before any wires are connected.

(q) If electric devices, such as electric blasting caps are used the legs of these devices shall be short-circuited by twisting the naked ends together, before taking them into the tunnel and shall remain so twisted until ready to be connected to the firing line.

(r) All lights used when leading shall be an enclosed type. If electric flash lamps are used, they shall be so constructed that it will not be possible to obtain a difference of potential between any two points on the outside of the lamp casing.

(s) No naked light shall be used in the vicinity of open chests or magazines containing explosives, or near where a charge is being primed.

(t) Fuses may be kept with detonators and all crimping or caps on fuse shall be done with a crimper and at least twenty-five (25) feet away from explosives.



(u) All drill-holes shall be of sufficient bore to admit of the free insertion to the bottom of the hold of a cartridge or explosives without the necessity of undue ramming or removing the dynamite from its original wrapper.

*Rule 11. Blasting:*

(a) There shall be one blaster in charge of blasting and he shall enforce his orders and directions and personally supervise the fixing of all charges and all other blasting operations and shall use every precaution to insure safety.

(b) In working chamber all electric light wires shall be provided with a disconnecting switch, which must be thrown to disconnect all current from the wires in the working chamber before electric light wires are removed or the charge exploded.

(c) The blaster shall cause a sufficient warning to be sounded and shall be responsible that all persons retreat to safe shelter, before he sets off blast, and shall also see that none return until he reports it safe for them. He shall report to the foreman and furnish names of all persons refusing to obey his caution.

(d) After the blast is fired, loosened pieces of rock shall be scaled from the sides of the excavation and after the blasting is completed, the entire working chamber shall be thoroughly scaled.

(e) The foreman in charge shall inspect the working chamber and have all loose rock or ground removed and the chamber made safe before proceeding with the work.

(f) Drilling must not be started until all remaining butts of old holes are examined for unexploded charges.

(g) No blaster shall attempt to use any dynamite that is frozen. No quantity than is sufficient for daily use shall be artificially thawed at one time. Only approved methods of thawing shall be permitted.

(h) When a blaster fires a round of holes he shall count the number of shots exploding, except in cases of instantaneous blasting by electricity. If there are any misfires he shall remain until such misfires have been exploded or holes made safe.

(i) Misfires shall not be approached even for the purpose of inspection until three hours have elapsed if fuse is used, or fifteen minutes have elapsed if electric blasting caps have been used, lest the trouble be a hangfire and not a misfire.

(j) Whenever feasible, a charge that has failed to explode shall be exploded by inserting a new primer in the hole on the old charge and detonating such primer.

(k) Blaster shall use only hard-wood rods for tamping with 7-inch rubber tip, and he shall not tamp or load any hole with a metal bar, nor shall the wooden rod have any metal parts.

(l) When firing by electricity from power or lighting wires in any tunnel, an approved switch shall be furnished with lever down when "off." The switch shall be fixed in locked box, to which no person shall have access except the blaster. There shall be provided flexible loads of connecting wires not less than five (5) feet in length with one end attached to the incoming lines and the other end provided with plugs that can be connected to the switch on the inside shot-firing circuit when firing and shall be at all times connected to an effective ground. After blasting, the switch lever shall be pulled out, the wires disconnected and the box locked before any person shall be allowed to return, and shall remain so locked until again ready to blast, and blasting wires must be laid on the opposite side of the tunnel from the lighting and power wires.

(m) All power lines and electric light wires shall be disconnected at a point outside the blasting switch before the loading of holes is proceeded with. No current by grounding of power or bonded rails shall be allowed beyond blasting switch after explosives are taken in preparatory to blasting, and under no circumstances shall ground current be used for exploding blasts.

(n) The blaster shall cause a sufficient warning to be sounded and shall be responsible that all persons retreat to safe shelter before he sets off blast, and shall also see that none return until he reports it safe for them. He shall report to the tunnel foreman and furnish names of all persons refusing to obey his caution.

(o) No person shall be allowed to deepen holes that have previously contained explosives.

(p) All wires in broken rock shall be carefully traced and search made for unexploded cartridges.

(q) Whenever blasting is being done in a tunnel, at points liable to break through to where other men are at work, the foreman or person in charge shall, before any holes are loaded, give warning of danger to all persons that may be working where the blasts may break through, and he shall not allow any holes to be charged until warning is acknowledged and men are removed.

(r) Blasters when testing circuits through charged holes shall use sufficient leading wires to be at a safe distance and shall use only approved types of galvanometers. No tests of circuits in charged holes shall be made until men are removed to safe distance.

(s) No blasts shall be fired with fuse in vertical or steep shafts.

(t) In shaft sinking where the electric current is used for firing, a separate switch not controlling any electric lights

shall be used for blasting and proper safeguards similar to those in tunnels shall be followed in order to insure against premature firing.

(u) It shall be the duty of the Superintendent of the tunnel to cause daily inspection of the roof and sides to be made by a competent person detailed for such purpose, and shall cause all loose pieces of rock to be removed from the roof and sides of the excavation.

(v) Before loading holes for a blast, all power and light wires shall be removed for a distance of not less than 150 feet from the heading.

(w) When the firing of blasts shall be done by electricity, the electrical energy for the blasting shall be obtained from the lighting service. A separate isolated circuit shall be run from an individual switch located in the head house, shaft or heading. The feeder switch shall be a Class A safety switch so constructed that it can be locked in either the open or closed position. If the switch is located in the shaft or head house all wires for the blasting circuits shall be run in separate iron conduits from the head house or shaft to a point 25 feet each way from the bottom of the shaft. All wires for the blasting service shall be run on the opposite side of the tunnel or shaft from the power or lighting wires. All wire used for blasting circuits, except the small bell wire used at the heading, shall have a red colored insulation to distinguish it from the other wire in the tunnels. Whenever necessary, the Constructor shall install in each heading a Class A safety switch constructed so that it can be locked in either the open or closed position. This switch shall be installed just ahead of the detonating switch.

(x) All direct or delay blasting caps shall be No. 6 or No. 8 Electric blasting caps.

(y) The insulation on all lead wires furnished with the blasting caps shall consist of a coat of enamel, covered with a double braid cotton insulation. The ends of all cap wires shall be free from enamel and tinned for sufficient distance at the free end to allow for splicing the wires to the blasting circuit wires.

(z) All blasting caps shall be ordered with a sufficient length of wire to allow at least two feet of wire to project out of the drill hole. No wire splices in drill holes will be permitted.

(aa) At least one wire on each cap shall have a distinguishing color of insulation.

(ab) All lighting used at the headings for loading shall be electric cap lights of a type approved by the United States Bureau of Mines. Floodlights may be installed, provided they are of proper construction and are maintained at a sufficient distance away from the heading.



(ac) All caps shall be shipped with the two wires short circuited and this short circuit shall not be removed, except for testing, until the caps have been installed in the drill hole.

(ad) A galvanometer test shall be made by some authorized party immediately before the caps are taken into the tunnel.

(ae) Where multiple loading is done either with direct or time delay caps, all caps in the same drill hole shall be connected in series.

(af) Lead-in wires for blast are not to be connected, before being positive that all the men working in the chamber are out.

*Rule 12. Additional Duties of Superintendent:*

(a) The constructor of every tunnel shall appoint a man who shall be personally in charge of the works and the performance of the work done therein, who shall be designated as the "Superintendent"; provided, however, that nothing herein contained shall prevent the owner or Constructor of any tunnel from personally filling the office of Superintendent.

(b) The Superintendent of every tunnel shall, each day, inspect or cause some competent person or persons appointed by him to inspect all appliances, boilers, engines, magazines, shafts, shaft houses, underground workings, roofs, pillars, timbers, explosives, bell ropes, speaking tubes, telephones, tracks, ladders, dry closets and all parts and appliances of said tunnel in actual use, and any such person or persons appointed by said Superintendent shall at once report any defects or hazards therein to the Superintendent. It shall be the duty of the Superintendent, upon ascertaining such defects or hazards, to take immediate steps to remedy the same, so as to make the same comply with the provisions of these rules, and he shall forthwith notify the Constructor of said tunnel of the existence of such defects or hazards. A record of all inspections made on each operation shall be kept on file. All foremen shall be notified by the Superintendent of hazards and the dangerous conditions before assuming charge of each shift. It shall be the duty of the Superintendent to appoint a competent man to have full charge under the direction of said Superintendent of every magazine containing explosives situated on such works, and to make such other appointment and perform such other duties as are provided by these rules to be performed by such Superintendent.

## PART "E"

Effective January 15, 1941

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## PART "E"

### RULES AND REGULATIONS

Relating to the Removal of Dusts, Gases, Vapors, Fumes and Mists  
released from

Spray, Flow, Dip and Brush Coating Operations

#### SEC. 1. SCOPE AND DEFINITIONS

*Rule 1. Scope:* These rules and regulations shall apply where spray, flow, dip and brush coating operations are used and the dusts, gases, vapors, fumes and mists generated therefrom constitute a hazard to the health of persons engaged in spray, flow, dip and brush coating operations. And it shall be the duty of every employer in this State to comply with these rules whenever the subject matter of such rules exist in any business, occupation or enterprise having employees. These rules shall not apply to the following:

(a) *Exemption for Small Quantities.* Where the amount of material used in any one day is not more than an aggregate of one (1) quart on the basis of an eight-hour work day provided, however, that in any establishment a separate work room shall be considered a separate establishment for the purpose of this exemption.

*Rule 2. Definitions:*

The following definitions shall apply in connection with all rules included herein:

(a) *Brushing.* The term "brushing" shall mean the method by which coating materials are applied with brushes.

(b) *Dipping.* The term "dipping" shall mean the immersion of an article, or any part thereof, into a container of coating material.

(c) *Spray Coating Equipment.* The term "spray coating equipment" shall mean any and all devices and equipment used in the application by atomization of coating materials by pressure methods.

(d) *Coating Materials.* The term "coating materials" shall mean paint, lacquer, varnish, stain, shellac, enamel, oil, wax, vitreous, metallic, flock, paint and varnish remover and in addition thereto any other coatings constituting a health, fire or explosion hazard.

(e) *Coating Applications.* The term "coating applications" shall mean brushing, dipping, spray coating, flow coat-

ing, roll coating, tumbling or and in addition thereto any other coating methods used for applying coating material where the application of such coating materials constitutes a health, fire or explosion hazard.

(f) *Mechanical Exhaust Ventilation.* The term "mechanical exhaust ventilation" shall mean any exhaust system operated by mechanical means.

(g) *Respiratory Protective Device.* The term "respiratory protective device" shall mean a device which is worn over the nose and mouth to provide protection to the wearers' respiratory system from substances which constitute a hazard to the health of the employee.

(h) *The Terms* "Harmful to health of the employees", and "hazardous", shall include any health, fire or explosion hazard to one or more employees.

(i) *Breathing Zone.* The immediate area around the nose and mouth.

(j) *Hazardous Areas.* The term "hazardous areas" shall mean areas where the concentration of dust, gases, vapors, fumes or mist are harmful to the health of the employees.

(k) *Non-Combustible Material.* The term "non-combustible material" shall mean any material that will not burn or support combustion and has fire retardant characteristics equivalent to three-quarter inches of cement plaster on metal lath.

(l) *Booths for Spray Coating Operations.*

(1) *Cabinet Booth* shall mean an enclosure open on one side or an enclosure open on one side and other openings to permit the ingress and egress of materials to be coated.

(2) *Canopy Booth* shall mean an overhead hood open on one or more sides.

(3) *Spraying Room* shall mean a room or enclosure specifically used for spray coating operations on large objects.

(4) *Tunnel Booth* shall mean an enclosure, with both ends open.

(5) *Staggered Tunnel Booth* shall mean an enclosure open on two opposite sides in staggered arrangement and provided with openings on opposite ends for ingress and egress of materials to be coated.

(6) *Down Draft Booth* shall mean an enclosure open at the top.

(m) *Brushing Table* shall mean a table, bench or other elevation provided with a down draft exhaust to remove the dust, gases, vapors, fumes and mists from the work conducted on such table, bench or elevation.



## SEC. 2. GENERAL RULES APPLYING TO ALL COATING OPERATIONS

### *Rule 1. Scope:*

These rules shall be applicable to all coating operations where such operations constitute a hazard to the health of the employees.

### *Rule 2. Equipment:*

(a) *Spraying Equipment.* All spraying equipment shall be capable of proper adjustment so as to control the formation of mist.

(b) *Paint Pressures for Spray Coating.* Paint pressure shall not exceed that necessary to produce a free flow of paint at the nozzle when the gun is operated independent of atomizing pressure.

(c) *Spray Coating at Different Levels.* At no time shall two or more operators engaged simultaneously in spray coating at elevations differing more than eight feet, use paint from the same supply tank unless spray guns are equipped with regulating valves.

### *Rule 3. Protection of Person:*

#### (a) *Nose and Mouth Protection.*

(1) *Respiratory Protective Devices.* When natural or mechanical ventilation is not adequate to protect coating operators and helpers or other persons working in the hazardous areas where there are harmful substances present, whether these locations be exterior or interior, such persons shall be protected with respiratory protective devices.

(2) *Types of Respiratory Protective Devices.* When hazardous substances used in coating operations are in the particulate form and a respiratory protective device is used it shall be the filter type. When the substances are in the form of gas or vapor, the respiratory protective device as required shall contain gas or vapor absorbents or adsorbents, such as activated charcoal. For protection against a combination of particulate matter and gases or vapors, the respiratory protective device shall contain both a mechanical filter and an absorbent or adsorbent. A positive pressure respiratory protective device may be used as a protection from either the particulate matter or gases or vapors or a combination of both of them instead of the particular type specified. All such respiratory protective devices which shall meet the current minimum requirements of the United States Bureau of Mines for similar equipment for the particular hazard to be guarded against shall be deemed compliance with this rule.

(b) *Cleansing of Respiratory Protective Devices.* Every respiratory protective device in use shall be cleansed

at least once each day with warm potable water and soap, where the filter type respirator is used, the filter shall be replaced as often as necessary. In case of intermittent use of a filter type of respirator, it shall be cleansed and filter replaced at least once each calendar day of use. The cleansed respirators shall be returned to the same individuals who used them prior to the cleansing, unless such respiratory protective devices have been sterilized before using again. The cleansing of respiratory protective devices shall be done as follows: Remove head bands and filtering elements and thoroughly wash the devices in warm soapy water. After this any one of the following solutions may be used for sterilizing purposes: (1) A solution of one part of formaldehyde solution in nine parts of water; (2) a 2 per cent solution of lysol; (3) a 3 per cent solution of carbolic acid; (4) exposure at room temperature for ten minutes in a moist atmosphere or antiseptic gas preferable formaldehyde; (5) scrub with a brush in a solution of five fluid ounces of cresolis compound and four gallons of water; (6) immersion for not less than 10 seconds in a solution of sodium hypochlorite containing not less than 100 parts per million available chlorine. Following this the devices shall be thoroughly rinsed with warm potable water and allowed to dry before using.

(c) *Body Protection.* Body shall be covered with clothing as close fitting as consistent with comfort, paying particular attention to fit at neck and wrists.

(d) *Hand Protection.* Hands shall be protected by gloves or by non-irritating protective skin coating.

(e) *Face and Neck Protection.* All exposed parts of the body shall be kept protected with non-irritating protective skin coatings during coating applications.

(f) *Clean Rags.* Clean rags or cloths for use on body shall be furnished by the employer.

#### *Rule 4. Containers:*

(a) *Construction of Pressure Tanks.* Every pressure tank supplying a spray nozzle shall be made from such materials and so constructed in order to adequately withstand the pressure for which it is designed to be used for, and will not burst or explode under operation. Compliance in this respect with the current rules for the construction of unfired pressure vessels of the American Society of Mechanical Engineers shall be deemed compliance by the employer with this rule. Every pressure tank meeting these specifications shall be so marked. All tanks of two gallon capacity and larger shall be designed so that the bottom of the tank will not be in contact with the floor.

(b) *Pressure Cups.* All pressure cups shall be capable of withstanding sixty pounds pressure without distortion.

(c) *Gravity Tanks.* All gravity tanks supplying spray nozzles shall be provided with metal covers that shall be kept

in place and those not resting on the floor shall be supported on metal brackets or be suspended by wire cables or heavy metal rods.

(d) *Solvent Containers.* Containers used for solvents for cleaning and for thinning purposes used in connection with coating operations shall be kept in non-combustible containers having self-closing or automatically closing covers.

*Rule 5. Maintenance and Housekeeping:*

(a) *Dirty Rags.* All used wiping and cleaning rags when used with inflammable materials shall be kept in covered non-combustible containers when not in use and such rags shall be removed daily and disposed of in a safe manner.

(b) *Disposal of Residue, Waste, Cleaning and Wiping Materials.* Combustible linings of booths and scrapings and drain boards, pans and floors which have been removed in the course of cleaning and rags, waste and other materials which have been used for wiping or cleaning shall be deposited in covered non-combustible containers or under water in open containers and removed daily and disposed of in a safe manner.

(c) *Storage of Materials—Volatile Liquids.* The main supply of solvents, paints, lacquers and other volatile materials shall be stored in a location remote from the coating process, or in a separate building or a room constructed of non-combustible materials.

(d) *Open Light, Fires, Etc.* Open lights, fires and welding operations shall be kept at least 50 feet from where coating operations are performed, and out of the path of dusts, gases, vapors, fumes and mists caused by such operations. If due to special conditions the minimum of 50 feet is inadequate then at such safe distance that will give the necessary protection.

### SEC. 3. BRUSH AND SPRAY COATING OF BUILDING AND STRUCTURES BOTH INTERIOR AND EXTERIOR —AND OUTDOOR COATING OPERATIONS

*Rule 1. Scope:*

These rules and regulations shall apply to all brush and spray coating operations on the interior and exterior of buildings, ships, and structures of any kind or nature, and to all out-door brush and spray coating operations.

*Rule 2. Operation:*

(a) *Coating Operations in Confined Spaces.* Whenever brush or spray coating operations are performed in any room, vault, bin, vat, tank, hopper, or any confined space in which there is no natural ventilation the employees engaged therein shall be provided with forced ventilation or shall be provided with adequate respiratory protective devices that will



protect employees. Any employee working in such confined places shall be provided with a lifebelt and line and such line shall be attended by an employee on the outside of such confined space if the mist, fumes and gases produce hazardous effects. Life belts and lines shall not be required if the means of ingress and egress from such confined places is by means of a doorway or opening at the floor level measuring not less than six feet vertical height and twenty inches in width.

#### SEC. 4. COATING OPERATIONS ON EQUIPMENT AND MANUFACTURED PRODUCTS INSIDE OF BUILDINGS

##### *Rule 1. Scope:*

These rules and regulations shall apply to spray, flow, dip, and brush coating, or other coating applications to equipment and manufactured products inside of buildings except coating operations on the interior and exterior of buildings, ships and structures.

##### *Rule 2. Dip and Flow Coating Equipment:*

(a) *Construction.* Tanks, vats, tubes, and other containers used for dip and flow coating purposes shall be tightly constructed and be free from leaks on the sides and bottom.

(b) *Drain Pipe.* All permanently located tanks, vats, tubs, and other containers used for coating materials of a flammable nature for dipping and flow coating purposes, with a surface area of more than six square feet, shall be provided with a drain pipe connected to the outside of the building or to a salvage tank located outside of the building. Such drain pipe shall have an area of not less than one square inch per each eighty gallons of tank capacity and in no event, shall such pipe be less than three inches inside diameter, which will permit the contents of the tank, vat, tub, or other container to drain off without spilling over the sides of such containers in the event the normal working level of the coating material within is exceeded. Such overflow pipe shall be attached to the side of the container and the overflow level of the pipe located just above the normal working level of the container. The overflow pipe shall be trapped below the normal working level of the coating material to prevent a fire traveling through the overflow pipe.

(c) *Drip Boards and Pans.* All coating drip boards or pans used in connection with all permanently located tanks, vats, tubs, or other containers containing flammable materials used for dip and flow coating purposes shall be provided with a smooth sheet metal top of not less than 16 U. S. S. gauge. The boards or pans shall be sloped or troughed to the center and also be pitched to drain the coating drippings into the coating container. The lowest pitched-end of the board or pan shall be diked off with a dike not less than 6" high so that the coating material will only return into the container through 1 $\frac{1}{8}$ " diameter hole located on a level with the lowest point of the

trough so that in the event water or other fire-extinguishing materials are poured on the board or pan, the dike will prevent most of the water or other substances from entering the tank, and such water or other substances will flow off the board or pan at the ends of the dike onto the floor.

(d) *Space Under Drip Boards and Pans.* All drip boards or pans used in connection with permanently located coating containers containing flammable materials for dipping and flow coating purposes, in which any part of such pan or board is within 4' of the floor, shall be completely housed or screened in underneath to prevent refuse from accumulating underneath, or to prevent such underneath space being used for storage purposes.

(e) *Fire Protection for Containers.* All permanently located tanks, vats, tubs, and other containers used for dip and flow coating purposes containing flammable coating materials shall be provided with automatic covers that will cover the opening of such containers when a fire occurs in or about such container, unless the nature of the dipping or flow coating operations will not permit the use of automatic covers, and in such cases the containers shall be protected against fire by automatic fire extinguishers filled with an extinguishing material suitable for putting out a fire caused by the type of coating used in the container.

*Rule 3. Ventilation Requirements for Dip and Flow Coating Operations and for Air Drying of Coated Surfaces:*

(a) *Dip and Flow Coating Operations.* The immediate area surrounding dip and flow coating containers having more than six square feet of exposed surface containing coating substances having volatile vehicles or thinners shall be mechanically ventilated during the dip or flow coating operations on the basis of the removal of a minimum of 2.5 cu. ft. of air per minute per sq. ft. of floor space as represented by an imaginary boundary line extending 25' horizontally in all directions from the edges of the dip coating container, except that mechanical ventilation shall not be required if the net open area of the doors and windows in the outside walls kept open during operations is five per cent or more of the gross floor area of the work room.

(b) *Air Drying of Coated Surfaces.* All parts coated with coating materials containing volatile vehicles and thinners which are air dried in rooms where workmen are employed, shall have the drying space ventilated during the period of occupancy on the basis of the removal of a minimum of 2.5 cu. ft. of air per minute per sq. ft. of floor space, as represented by an imaginary boundary line extending 25' horizontally in all directions from the outside edges of the group of parts being air dried, except that mechanical ventilation shall not be required if the net open area of the doors and windows in the outside walls kept open during the period

of occupancy is five per cent or more of the gross floor area of the work room.

If ventilated spray booths are used in the same room or area in which there is air drying of parts, the amount of air exhausted through the booth exhaust system may be considered as applying to the amount of air to be exhausted from the air drying of coated surfaces requirements.

(c) *Small Work Places or Rooms.* In no case under the provisions of (a) and (b) of this section shall it be necessary to change the air of work rooms or spaces more than ten air changes per hour unless unusual conditions should require more ventilation.

#### *Rule 4. Spray Coating Applications:*

All spray coating applications on objects inside of buildings shall be performed within booths equipped with mechanical exhaust ventilation with the following exceptions:

(a) *Objects not Suitable for Booths.* Objects not a regular part of the plant production and not occurring in regular sequence and for which there is no ventilated booth adaptable.

(b) *Large Objects.* Large objects such as heavy machinery and equipment, large castings and structural members not adaptable to booth spray coating.

#### *Rule 5. Booth and Room Construction:*

(a) *Booths.* Booth construction shall be constructed of metal in such a manner as to facilitate effective maintenance and control of required ventilation.

(1) *Floors.* If the building floor on which any booth is installed is of combustible material, the floor within the booth and for a distance of four feet in front of the booth openings shall be covered with non-combustible material, except that bench type booths shall not be required to have non-combustible building floor covering under the benches nor for a distance of four feet in front thereof.

*Booths* in which vitreous enamel is used exclusively shall not be required to have non-combustible floors.

(2) *Fire Curtains.* Every booth opening shall be constructed with a fixed metal curtain along the upper outer edge of the booth. Such curtain shall project downward from the inside top of the booth not less than two and one-half inches.

(3) *Inside Surfaces.* The inside surfaces of booths shall be of smooth construction and free from obstructions to facilitate cleaning.

#### (b) *Spraying Rooms.*

(1) *Room Construction.* Every spraying room installed in a building of non-combustible construction and in which all parts of the spraying room are of non-com-



bustible construction or in any type of building where automatic sprinkler protection is provided may be used without further fire protection.

Spraying rooms installed in combustible type of buildings which are not sprinklered, or any parts of the spraying room which are constructed of combustible material in any type of building, shall have the combustible wall and ceiling surfaces and the exposed structural members covered with at least  $\frac{3}{4}$  inches of cement-plaster or metal lath.

(2) *Exits.* Any spraying room having more than 400 square feet of floor area shall be provided with means of ingress and egress located in two separate walls.

*Rule 6. Ventilation Requirements:*

(a) The following rules shall apply while the booths are in use:

(1) *Cabinet Booths.* All cabinet booths shall be provided with mechanical exhaust ventilation that will provide a minimum average of 100 linear feet per minute of air flow into all openings, but in no event shall the velocity of the air be less than an average of 100 linear feet per minute in any vertical cross sectional area in the booth in which the operator works.

(2) *Canopy Booths.* All canopy booths shall be provided with mechanical exhaust ventilation that will produce a minimum average of 100 linear feet of air flow into the canopy or hood over the entire projected area of the canopy or hood.

(3) *Tunnel Booth.* Tunnel booths shall be provided with mechanical exhaust ventilation that will provide a minimum average of 100 linear feet per minute of air flow into all openings, but in no event shall the minimum amount of air in cubic feet per minute exhausted from such tunnel booth be less than the product of the projected floor area in square feet of such tunnel booth multiplied by seventy-five.

(4) *Spraying Rooms.* (i) All spraying rooms except as exempted herein shall be provided with mechanical exhaust ventilation that will give not less than the following number of air changes per hour based on the gross cubical content of such rooms, but in no case shall the total amount of air exhausted per hour be required to exceed twice the minimum requirements for one spray gun operation.

In applying the requirements of this clause, artists', signpainters' and stencilers' and touch-up spray guns passing not more than two cubic feet of atomizing air per minute shall not be considered as spray guns in calculating the number of room air changes per hour:

Cubic Contents of Room	Minimum Number of Air Changes Per Hour for One Spray Gun	Number of Air Changes Per Hour To Be Added for Each Additional Spray Gun Operated
Rooms up to and including 7,500 cubic feet	30	10
Rooms over 7,500 and not to ex- ceed 15,000 cubic feet	20	6 $\frac{2}{3}$
Rooms over 15,000 cubic feet	15	5

(ii) Any spraying room of over 35,000 cubic feet cubical content, in which the spray operators and helpers in proximity of the spraying operation are provided with positive air pressure respiratory protective devices and all others away from the proximity of the spraying operation are provided with mechanical respiratory protective devices, shall be provided with not less than ten air changes per hour.

(b) *Direction of Air Flow in All Types of Booths.* The direction of air flow in all types of booths shall be such as to convey the dust spray, mist and fumes away from the breathing zone of the operator and others, working in such booth, to the air discharge outlet.

(c) *Mechanical Exhaust Ventilation Common to Two or More Booths.* Two or more booths shall not be connected to the same common mechanical exhaust ventilation system if different spray residues produced in the booths are not removed before commingling in the exhaust system as a result of which heat will be generated and cause a fire hazard.

(d) *Exhaust Outlet Location.* The exhaust outlets from all types of booths shall be located, or the booth provided with distribution plates, as to maintain an average uniform air velocity toward the exhaust outlet.

(e) *Removing Coating Material from Exhausted Air.* Every exhaust system applied to any booth shall be provided with a distribution or collector plate or plates or some type of air cleaner that will aid in the removal of the coating material from the exhausted air before such air reaches the air flow producing equipment. All distribution or collector plates shall be removable and supported by non-ferrous supports to minimize sparking.

(f) *Discharge of Exhausted Air.* All air exhausted from booths shall be discharged out of doors. The discharge of any exhaust pipe out of doors shall be located so that the dis-

charged material does not constitute a hazard. The discharge outlet shall extend above the roof line of any adjacent building.

(g) *Brushing Tables.* All brushing tables when in use shall be provided with not less than an average of 200 linear feet per minute air velocity flowing over the entire area of the table and in no event shall the object being brushed be closer than six inches to the edges of the table.

(h) *Air Flow Producing Equipment.* All mechanical exhaust ventilation equipment located in the airways or piping of exhaust systems handling flammable materials shall be constructed of materials which will minimize sparking. No motors shall be installed in airways or piping which exhaust flammable materials. All belt-drive passageways in airways or piping shall be totally enclosed in an air tight enclosure inside the airway or pipe. Bearings of fans located inside of airways or piping shall be arranged to permit oiling from the outside of the airway or pipe.

#### *Rule 7. Air Supply:*

(a) *Quantity.* Fresh clean air shall be supplied either by natural or mechanical means to at least equal the amount of air exhausted to all rooms containing mechanical exhaust systems. Where a mechanical exhaust system is located in building or room and the volume of air exhausted through the booth is only a small portion of that available, and the withdrawal of this air is such that it does not appreciably affect the air conditions or distribution in other working areas, it shall not be necessary to provide air supply other than through the general ventilation system or natural infiltration.

(b) *Location.* The air supply for replacement purposes shall be delivered at a point or points so that excessive drafts will not be produced.

#### *Rule 8. Exhaust piping:*

(a) *Piping and Duct Work.* All piping and duct work in the exhaust system shall be of non-combustible materials and shall be as short, direct and free from resistance to air flow as practicable.

(b) *Gates and Dampers.* Where gates and dampers are provided for the purpose of shutting off flow of cold air into buildings when the exhaust system is not operating, such gates and dampers in the entire exhaust system shall be fully opened during the time of operation of the exhaust system.

#### *Rule 9. Electrical Equipment:*

(a) All electrical equipment shall be installed so as the fumes from the paints or lacquer will not cause an explosion



or fire hazard. Compliance in this respect with the current provisions of the National Electrical Code of the National Fire Protection Association, shall be regarded *prima facie* evidence of compliance by the employer with this rule.

(b) *Lighting Equipment Installed Outside Booths.* Every booth, other than a spraying room, in which flammable materials are handled, where artificial illumination is necessary, shall be lighted with vaportight or explosion proof types of lamps located outside of the walls and ceilings of the booth. The edges of the openings in the ceilings or walls of the booth through which the light rays are admitted shall not be closer than one inch to the lamp. Vaportight or explosion proof types of lamps may be installed just outside the booth at the booth openings.

(c) *Lighting Equipment Installed Inside of Booths and Spray Spraying Rooms.* Illumination of any booth or spraying room in which flammable materials are handled and where internal lighting is installed shall be with explosion proof type lamps.

*Rule 10. Grounding of Equipment in Connection with Spray Coating:* All exposed non-current carrying metal parts of electrical equipment serving any booth in which flammable material is used, and all metal parts of any booth in which flammable material is used, shall be electrically bonded and permanently and effectively grounded to a metallic underground water piping system or equivalent grounding electrodes.

*Rule 11. Booth and Spraying Room Coating Operations:*

(a) *Object to Be Spray Coated.* The portion of every object to be spray coated shall be inside the booth or spraying room during spray operations, and shall be arranged to permit easy access and manipulation, and so that the direction of spray will be toward the exhaust outlet.

(b) *Self-Propelled Objects.* No self-propelled object shall be driven into or out of a booth or spraying room while there is any spraying being done or shall any such object be sprayed if the temperature of any part of such object is above 400 degrees Fahrenheit.

(c) *Materials Sprayed Alternately.* There shall be no spray coating or lacquers in any booth or spraying room in which oils, varnishes or paints are used, unless the booth and all parts, including all equipment, are thoroughly cleaned between operations so that there will be no mixture of the different ingredients to cause a fire hazard, except that parts of a booth and exhaust equipment in a water-wash installation shall not have to be cleaned in or beyond the water wash.

*Rule 12. Maintenance and Housekeeping:*

(a) *Cleaning of Booths and Spraying Rooms.* Every booth and spraying room in which continuous spray coating

operations are performed shall have accumulations of coating residue removed at least once a week. Scrapers and rubbers shall be of non-ferrous and nonflinty material.

(b) *Cleaning of Exhaust Systems.* All exhaust airways and piping and air-flow producing equipment shall be cleaned at sufficiently frequent intervals to maintain the required air-flow.

(c) *Cleaning of Other Equipment.* Floors, walls and ceilings in coating areas shall be kept clean and tanks, mixers, spray guns and equipment shall be kept clean and free from accumulations of coating materials.

(d) *Booths Prohibited as Store-Rooms.* No materials or equipment shall be stored in any spray booth or spraying room.

*Rule 13. Fire Protection Equipment:*

Fire extinguishers or fire fighting equipment suitable for nature of the hazard and materials involved, where flammable materials are used, shall be provided and located within twenty-five feet of any booth or dipping or flow coating operations. Every spraying room in which flammable materials are used shall be equipped with fire extinguishers or fire fighting equipment suitable for the nature of the hazard and materials involved.

## PART "F"

Effective May 1, 1941

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## PART "F"

### RULES AND REGULATIONS

Relating to

#### THE SAFETY AND HEALTH OF WORKERS

Employed in Ferrous and Non-Ferrous Operations Where Castings of  
Base Metals are Made and Shall Include All Operations  
in Connection Therewith

#### SECTION 1. SCOPE.

##### *Rule 1. Scope:*

These rules and regulations shall apply to all ferrous and non-ferrous operations where castings of base metals are made and shall include all operations in connection therewith, to protect the safety and health of persons engaged therein from injury and harmful dusts, gases, vapors, and fumes and it shall be the duty of every employer in this state to comply with these rules wherever the subject matter of such rules exist in any business or enterprise having employees.

#### SECTION 2. GENERAL RULES APPLYING TO PREVENTION OF ACCIDENTAL INJURY TO EMPLOYEES.

##### *Rule 1. Scope:*

The rules and regulations under this section shall apply to all operations, equipment, and maintenance for the prevention of accidental injury to employees engaged in operations defined in Section 1, Rule 1.

##### *Rule 2. Places of Employment:*

(a) *Ventilation of Places of Employment.* All places of employment in which processes covered in Section 1, Rule 1 of this Part are carried on shall have windows, skylights, transoms, or ventilating flues which are used exclusively for the ventilation of the general atmosphere within the room or enclosure, doors not included, opening to outside areas, the net open area of which shall be not less than 5% of the floor area of the room or enclosure, except as provided for in Paragraphs (b) and (c) of this Rule.

(b) *Places of Employment for Defense Purposes.* Places of employment, designed exclusively for national defense purposes, may be located underground or designed for black-out purposes, and windows, skylights, transoms, and ventilating openings may be eliminated, if mechanical ventilation is provided and operated during periods of occupancy so that the amount of ventilation provided shall be not less than one cubic foot of air, drawn from an uncontaminated out-of-doors source per square foot of floor space per minute.

(c) *Building Constructions Which Do Not Comply with Rule 2, Paragraph (a).*

In all places of employment in which openings to the outside are not provided, as required in Rule 2, Paragraph (a) of this Part, shall have mechanical ventilation which shall be operated during periods of occupancy so that the amount of ventilation provided shall be not less than one cubic foot of air, drawn from an uncontaminated out-of-doors source per square foot of floor space per minute.

*Rule 3. Entrances:*

Entrances to heated buildings shall be protected during cold weather in such a way as to eliminate harmful drafts striking employees employed within the building, and in such a manner as to permit the passage of conveyances regularly used in plant operations except that this rule shall not apply to entrances used for railroad or industrial cars handled by motive power or for travelling cranes, horsedrawn vehicles, trucks, and automobiles. These entrances shall remain open during cold weather only for such time as is necessary for the ingress and egress of such equipment.

*Rule 4. Locomotives and Locomotive Cranes Operated in Buildings:*

Fuel fired or internal combustion engine operated locomotives or locomotive cranes operating on rails shall not remain in buildings during regular occupancy and shall only enter such buildings during regular occupancy for the specific purpose of moving cars or switching.

*Rule 5. Vision Through Swinging Doors:*

All doors of the double acting swinging type shall be provided with an opening not less than the equivalent of an 8 x 8 in. opening located at normal eye level distance above the floor so that a view can be had beyond the door.

*Rule 6. Stair Railings:*

All stairways, open on one or both sides, shall have the open sides protected with standard guard rails and shall comply with Rule 11 of Part "B".



*Rule 7. Floors, Pits and Galleries:*

(a) *Condition of Floors.* All floors shall be kept firm and level and shall be cleaned and leveled as often as necessary to provide and maintain safe working conditions.

(b) *Floor Adjoining Tracks.* The floor immediately adjoining tracks over which employees frequently pass shall be firm and flush with the top of the rail. Clearance for passage of truck wheel flanges shall be provided between floor and track.

(c) *Floors at Melting Units.* The floor beneath and immediately surrounding melting units shall be pitched away from the melting unit to provide drainage. The floor shall be kept free from pools of water and shall only be damp enough to hold down the dust in order to prevent an explosion hazard.

(d) *Guarding of Floor Openings.* All floor openings shall be covered or railed when not in use.

(e) *Pits.* All pits connected with ovens or furnaces shall be at all times protected with either a protecting cover or standard guard rail.

(f) *Molten Metal Pits.* All pits in which molten metal is handled shall be free from dampness in order to avoid danger of explosion and splashing of metal.

(g) *Galleries.* Galleries where molten metal is poured into molds shall be provided with solid, leak-proof floors and partitions of materials resistive to molten metal. The partitions shall be not less than 42 in. high and shall be installed on the open sides of such galleries.

(h) *Protection Against Molten Metal on Floors.* Molten metal poured into pig beds or from overflow from molds or from accidental runouts from melting units, ladles, or molds shall be railed off while such metal is in the molten state as to places which any employee is required to use.

*Rule 8. Gangways for General Traffic:*

(a) *General Gangways.* Gangways other than those for carrying molten metal shall be at least 3 ft. wide and shall at all times be kept in good condition, sufficiently firm to withstand the travel for which they are intended and uniformly smooth and free from obstructions.

(b) *Condition of Gangways.* Every gangway employed for the handling of molten metal shall, during the progress of distribution and pouring of metal, be kept uniformly smooth, clear of obstructions and free from pools of water.

(c) *For Truck and Manually Operated Monorail Ladles.* Gangways where molten metal is distributed in trucks or manually operated monorail ladles shall be not less than 24 in. wider than the extreme width of the ladle equipment.

(d) *For Hand Shank Ladles and Crucibles.*

(1) *By Not More Than Two Employees.* Gangways where molten metal is distributed in hand shank ladles or crucibles which are carried by not more than two employees shall be not less than 3 ft. wide.

(2) *By More Than Two Employees.* Gangways where molten metal is distributed in hand shank ladles or crucibles which are carried by more than two employees shall be not less than 4 ft. wide.

(e) *Gangways Used for Parallel Molten Metal Operations.* Gangways in which truck or manually operated mono-rail ladles travel parallel shall be not less than twice the width required for one ladle operations.

#### *Rule 9. Aisles Serving Molding Floors:*

(a) *Condition of Aisles.* Every aisle in which molten metal is being handled shall be kept in good condition, clear of obstructions, firm, uniformly smooth and free from pools of water at all times when molten metal is being handled.

(b) *For Hand Ladles or Crucibles (Not More Than Two Employees).* Aisles where molten metal is carried in hand ladles or crucibles and poured into molds on the molding floor by not more than two employees per ladle or crucible shall be not less than 15 in. wide except where molds alongside the aisles are more than 20 in. high above the aisle level; in which case the aisle shall be not less than 24 in. wide.

(c) *For Hand Ladles or Crucibles (More Than Two Employees).* Aisles where molten metal is carried in hand ladles or crucibles and poured into molds on molding floors by more than two employees per ladle or crucible shall be not less than 36 in. wide.

#### *Rule 10. Cupola Charging Equipment:*

The space underneath any cupola charging elevators, machines, lift hoists, skip hoists and cranes shall be railed off or guarded to prevent material dropping on employees below, during charging operations.

#### *Rule 11. Blast Gates:*

Blast gates shall be provided in the air blast pipe that supplies air to the melting equipment and such gates shall be closed off when the air supply fails or the melting equipment is shut down to prevent the accumulation of combustible gases in the air supply system and minimize the explosion hazard. Except that in the case of cupolas the blast gate may be omitted if alternate tuyeres are opened to permit air circulation.

#### *Rule 12. Repairing Cupola Linings:*

A substantial screen or guard shall be provided in the cupola and located above any employee working therein to protect them

against falling objects. Such screens or guards shall be constructed of not less than  $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$ -in. angle iron covered with a screen, the equivalent in strength of a 1-inch mesh of  $\frac{3}{16}$ -in. wire or not less than No. 12 U. S. gauge solid sheet steel. Such screens or guards shall be securely supported by means of overhead slings or underpinings to resist any falling object.

*Rule 13. Slag Hole Shields:*

Where it is necessary to protect against the splashing or flowing of slag, the slag spout shall be equipped with a shield or guard.

*Rule 14. Cupola Bottom Support:*

The cupola bottom doors, while the cupola is in operation shall be supported by at least two metal props of the required structural strength. Such props shall be supported on metal prop bases set on a concrete footing, or other fabricated footing of equivalent strength, and the props shall be adjusted to proper height by means of screws or wedges.

Temporary supports shall be placed under the cupola bottom doors while the metal props are being adjusted to the proper height for the closed doors to prevent the doors falling on the employees in the event the metal props slip out of place.

When the bottom is dropped either manually or automatically, the employees dropping the bottom shall be protected by a permanent or movable enclosure or guard.

*Rule 15. Furnace Tap Holes:*

Unless tap out holes are accessible from the ground, furnaces shall be provided with platforms movable or stationary, which will allow the employees to perform their work safely while making or tapping tap holes or preparing furnace runner spouts.

*Rule 16. Crucible Furnaces:*

Where the crown plate of an upright crucible furnace is elevated above the surrounding floor in excess of 12 in., (except furnaces in which the crucible is handled into and out of the furnace by mechanical hoists), the furnaces shall be equipped with a platform with standard guard rails and toe boards. Such platform shall be constructed of metal or other fireproof materials and shall extend around the front and sides of the furnace flush with the crown plate and shall be clear of obstructions.

When the combined weight of a crucible containing molten metal and the crucible tongs exceeds 100 lbs. the crucible shall be removed from the furnace by not less than two men or by mechanical means, and when the combined weight of the crucible and tongs exceeds 300 lbs. three or more men or a mechanical handling device shall be employed.

*Rule 17. Lancing of Tap Out Holes:*

Where tap out holes are cut, lanced or burned out with oxygen, a guard shall be placed in front of the tap hole to prevent hot material from being blown onto the employees.



*Rule 18. Ladle Pits:*

(a) *Safeguarding.* Where pits are required for metal and slag ladles at melting equipment, such pits shall be kept clean and dry unless special equipment is installed for quenching and breaking up slag by means of water. All such pits shall have at least one foot clearance over the greatest overall dimension of the ladle. All such pits shall have removable standard guard rails or cover plates to prevent employees from falling into them when not in use.

(b) *Employees Not Allowed in Ladle Pits.* An employer shall not require any employee to enter pits used for metal or slag ladles while metal or slag is being poured into the ladles.

*Rule 19. Charging Machines:*

Charging machines shall have all gears and pinions completely guarded and all wheels moving on tracks shall be covered with guards extending to within  $\frac{1}{2}$  in. of the rail to prevent employees from being injured. Charging machines shall be equipped with a warning sounding device, operated either automatically or by hand, and when in motion shall sound a warning. Operators of charging machines shall be protected from molten metal or sparks by a guard to prevent the operator from being burned.

*Rule 20. Charging Boxes:*

Charging boxes shall have not less than  $\frac{3}{4}$ -in. diameter holes in the bottom on not over 6-in. centers to insure proper drainage.

Contents of charging boxes containing ice or snow shall not be charged into the furnace.

*Rule 21. Oven Equipment:*

All gaseous and oil fired ladle, core, blacking, annealing, and other types of ovens of more than 200 cu. ft. internal volume shall be provided with means for thoroughly purging all internal parts of the oven of combustible gas pockets before the burners can be lighted. Such purging shall be equivalent to at least four complete fresh air changes and purging shall not be construed to mean recirculation.

All ovens of 200 cu. ft. internal volume or less and not equipped to be thoroughly purged before the burners can be lighted shall be so designed that the oven doors must be opened in order to light the burner equipment. Where oven purging is dependent on opening of doors, the doors shall be fully open for 5 minutes before lighting the burners. Large fans may be employed in blowing out ovens before lighting to remove gas pockets.

All ovens shall be equipped with combustion safeguards that prevent unburned fuel discharging from burners into the ovens, in the event of flame failure. Such combustion safeguards shall be of the quick-acting type on ovens of more than 200 cu. ft. internal volume.

Explosion vents in the ratio of one sq. ft. of vent area for 15 cu. ft. of oven volume shall be provided. These vents shall be in the form of doors held closed by means of friction latches or loose top panels.

Printed instructions for the routine to follow in lighting ovens shall be plainly posted at the burner equipment.

*Rule 22. Tilting and Reservoir Ladles:*

Tilting types of ladles for distributing molten metal or for any reservoir or mixing purposes or for slag and of any type of construction and mounted on stationary supports, trucks or handled by overhead crane or monorail and not of more than 2,000-lb. capacity may be of a hand shank type and shall be provided with a manually operated safety lock; or may be of a gear operated type equipped with an automatic safety lock or brake except all such ladles of over 2,000-lb. capacity shall be of the gear operated type equipped with an automatic safety lock or brake to prevent overturning or uncontrolled swaying. If ladles are mechanically or electrically operated, an automatic safety lock or brake shall be installed to prevent overturning or uncontrolled swaying.

*Rule 23. Hand Ladle Construction:*

All shanks for hand ladles shall be made from solid material. Tubular material shall not be used.

*Rule 24. Lips on Ladles:*

The rim or lip on hand or bull ladles shall not be built up above the top of the metal shell with refractory material more than  $\frac{1}{2}$  in. unless the refractory ladle lining is  $1\frac{1}{2}$  in. or more in thickness at the rim, in which case the maximum height shall not be greater than 1 inch.

*Rule 25. Storing of Ladles:*

Lined ladles shall not be stored or kept in a damp atmosphere or exposed to any moisture.

*Rule 26. Drying of Ladles:*

All ladles shall be thoroughly dried out before using.

*Rule 27. Crane Buckets:*

The load carrying parts of crane buckets for the movement of materials by overhead crane shall have a factor of safety of at least five (5). When buckets have movable bails, safety locks or catches shall be provided and used to prevent overturning.

*Rule 28. Slings and Sling Beams:*

All slings used to suspend loads from overhead equipment shall either be so designed that there are safe clearances for a hand grip, or handles shall be provided to hold the sling. Sling beams

which are adjustable for different sizes of loads shall be so constructed that the slings cannot slip off the beam.

*Rule 29. Trunnions:*

Trunnions used on flasks, buckets, ladles and other equipment to facilitate handling shall be constructed with a factor of safety of at least ten (10) including the method of attachment to the equipment. The diameter of the head on the outside end of the trunnion shaft shall not be less than 1.5 times the diameter of the trunnion shaft. When such trunnions are used with portable slings or hooks there shall be at least an overall clearance of  $\frac{1}{4}$  in. between the inside of the trunnion base and the trunnion head over the maximum size of sling or hook employed. The inside corners where the trunnion shaft joins the base and the head shall be filleted to prevent the sling or hook riding the trunnion base or head.

*Rule 30. Floor Operated Hoists:*

Air and electric hoists operated from the floor by means of pull chain switches or valves operated by two chains or rods shall be equipped with easily recognized markers on the operating devices to denote "hoist" and "lower" or words to that effect.

All control devices shall be clear of hot metal or slag containers.

*Rule 31. Swivel Load Carrying Hooks:*

All swivel load carrying hooks on any type of hoisting equipment that are attached to a shank or bolt by means of a threaded nut in which the action of the swiveling hook may cause the nut to turn, shall have the nut locked in place by means of a pin or other locking device.

*Rule 32. Crane Track Wheel Bumpers:*

All overhead and gantry crane tracks shall be equipped with track wheel bumpers that will stop the movement of the crane and prevent the crane from running off the crane runway or striking the building structure. Such bumpers shall be accurately located so that the crane can be re-aligned from them on the runway. All such bumpers shall not only be anchored to the crane rails, but also to the rail girders or other supporting members.

*Rule 33. Outside Cranes to Be Anchored:*

All overhead and gantry cranes located out of doors shall be securely fastened to the crane rails or supporting members when crane is not in operation, to prevent heavy winds from moving the crane.

*Rule 34. Crane Cabs:*

Operators in crane cabs shall be protected from the outdoor elements or from heat if handling molten metal.



*Rule 35. Crane and Hoist Construction:*

All hand and power operated jib, overhead traveling, gantry and monorail cranes and hoists installed in the future shall have all load carrying frame members constructed of fabricated or cast steel or from a material equivalent for tensile strength and ductility.

*Rule 36. Hoisting Mechanism Limit Switches:*

All mechanically operated hoisting mechanisms shall be provided with limit switches that will prevent the lower block being pulled into the hoisting drum.

On installations made after the effective date of this rule, hoisting mechanism shall be provided with a limit switch to prevent over-travelling in the lowered position.

*Rule 37. Warning Devices on Crane and Monorail Cabs:*

All cab operated overhead and gantry cranes and monorail hoists shall be provided with warning sounding devices.

*Rule 38. Riding on Hoists Prohibited:*

No employer shall permit employees to ride on any hoisting device or load that is being hoisted, except in cases of emergency or for some special reason an employee may be hoisted to some elevation by means of a hoist without a load, in which case the employee shall be provided with a saddle sling and the employee shall be securely fastened therein and the sling shall be securely fastened to the hoisting mechanism.

*Rule 39. Swinging and Dangling Crane Chains:*

Swinging or dangling crane chains or loads shall be hoisted to clear all obstructions when the crane is in motion.

*Rule 40. Overhead Conveyors:*

When overhead conveyor systems pass over passageways and working areas, the employees beneath shall be protected with substantial screens, grilles, or guards, the strength of which shall be sufficient to resist the fall of the heaviest piece handled by the conveyor.

*Rule 41. Chain Conveyor Dogs:*

When chain conveyors operate at various levels, other than in a fixed horizontal plane, a mechanism of safety dogs shall be installed on the up and down grade inclines that will hold the chain and prevent the load chain from piling up at the bottom of the incline in case of chain failure.

*Rule 42. Shut-Off for Power Conveyors:*

Where it is necessary that employees work in connection with a power conveyor at a point where the conveyor passes into a tunnel or wall opening and there is no space around the conveyor for the passage of a workman, such opening shall be

guarded by a gateguard, hooked up electrically or mechanically, so that when the gate is contacted the conveyor mechanism will shut off.

*Rule 43. Conveyor Pallets:*

Open spaces between the pallets on conveyors at conveyor turns shall be eliminated or closed up or guarded if accesible to the employees.

*Rule 44. Elevators:*

(a) *Elevator Gates Required.* All elevator openings at the floor levels to the elevator hatch shall be protected by elevator gates, either manually or mechanically operated.

(b) *Gate Interlocks.* All elevators shall either be electrically or mechanically interlocked with the elevator platform so that it is impossible to start the elevator until the gate is in closed position, and also that it is impossible to open the gate until the elevator is at the floor level.

(c) *Safety Blocks.* All elevators other than hydraulic elevators shall be equipped with safety blocks operated by speed governor control that will hold the elevator in case of cable failure or over speeding.

(d) *Hatch Limit Controls.* All types of elevators shall be equipped with upper and lower travel limit devices that will prevent the elevator from over traveling.

*Rule 45. Monorails:*

All monorails or telferage systems shall be provided with automatic guards that will prevent the trolley equipment running off at open switches. Permanent guards shall be provided at the ends of all such equipment.

*Rule 46. Inspection of Equipment:*

All load carrying equipment, including cranes, hoists, monorails, chains, slings, cables, bales, buckets, containers, ladles for the transportation of molten metal, and the like shall be carefully inspected at least once a month to determine that the equipment is safe for handling the loads the equipment was designed for and record of all such inspections shall be kept on file for the review of the Department of Labor.

*Rule 47. Storage Bins:*

(a) *Hopper Bins.* Hopper bins containing material which is fed out at the bottom either by hand or mechanical means shall be covered with a grating securely fastened in place which will allow the use of pokers to break up bridging of the stored material but will not permit an employee to enter the bin. When it is necessary to enter the bin, safety belts and lines shall be furnished and one or more assistants shall

be on duty to attend the safety lines. No bridged material shall be broken down at any time that any person is in the hopper.

(b) *Floor Storage Piles.* Employers shall instruct the employees, who are removing materials from bins located at floor level or from storage piles, that they shall not undermine the pile and thereby prevent cave-ins.

*Rule 48. Scrap Breakers:*

(a) *Shears.* Shears shall be guarded to prevent operators and passing employees from being injured by flying particles and a clear, level floor shall be provided within the working area.

(b) *Drops.* The breaking of castings or scrap by the use of a drop inside the buildings during working hours shall be prohibited unless such operations are performed within a permanent enclosure consisting of not less than 2-in. planking or equivalent protection. Such enclosures shall be of sufficient height to protect employees working in the vicinity from injury by flying fragments of metal. When the ball is dropped by rope, the rope shall extend over pulleys to a point clear of the breaking area so that the operator will be at a safe distance and to prevent entanglement.

*Rule 49. Storage of Materials and Equipment:*

Space shall be provided for the storage of all materials and equipment. Materials and equipment not in regular use shall be put into storage. All materials and equipment shall be stored in a safe, orderly manner on level and substantial foundations.

*Rule 50. Flammable Liquids:*

Flammable liquids of 100 degrees F. Tagliabue closed cup tester and less shall be stored in locations away from exposure to fire in leak-proof metal containers. Compliance in this respect with the current rules for the storage of flammable liquids of the National Fire Prevention Association shall be deemed compliance of the employer with this Rule.

When it is necessary to transport and use flammable liquids on the job, liquids shall be contained in heavy metal containers with tight and leakproof openings to prevent accidental ignition. Compliance in this respect with the current rules for containers for the transporting of flammable liquids of the Underwriter's Laboratory shall be deemed compliance by the employer with this Rule.

*Rule 51. Chipping:*

Where castings are cleaned or chipped, the area shall be segregated by permanent or movable screens or partitions to protect other employees from flying chips. Where the nature of the work permits, screens or partitions shall be employed to segregate the individual operations.



*Rule 52. Finishing Rails or Benches:*

Where finishing rails or benches are used they shall be sufficiently far apart to allow the operator to pass between the rails or benches and walk without being endangered by falling objects.

*Rule 53. Grinding, Polishing and Buffing Equipment:*

All grinding, polishing and buffing equipment wheels shall be covered with a guard or enclosed as much as possible consistent with the type of work being performed to reduce the amount of material being thrown into the atmosphere, and the enclosure or guard shall be of such strength to withstand and withhold fragments from a bursted wheel.

All steady rests in front of wheels shall be kept adjusted close to the wheel to prevent the work from jamming between the wheel and steady rest.

*Rule 54. Tumbling Mill Equipment:*

(a) *Guard Rails.* All tumbling mills not provided with a complete enclosure shall be provided with a standard height guard rail, completely protecting the exposed parts of the mill when operating.

(b) *Locking Devices.* All tumbling mills shall be equipped with a positive locking device that will prevent the mill from turning over when loading or unloading the mill. Such device shall prevent the turning of the mill due to the unbalancing of the load within the mill or from the source of power.

Brakes shall not be construed as a positive locking device.

*Rule 55. Arc Welding Operations:*

All regular arc welding shall be conducted within an enclosure or partial enclosure to prevent the light rays penetrating to other employees. Wherever possible, on irregular or maintenance arc welding operations, portable guards should be used.

*Rule 56. Fans:*

Fan blades on any fan exposed to contact shall be guarded with a substantial wire mesh screen. If such guard is within 4 in. of the impeller, the openings of the guard shall not permit the insertion of  $\frac{1}{2}$ -in. ball. If further away than 4 in., the openings in the guard shall not permit the insertion of  $1\frac{1}{2}$ -in. ball.

*Rule 57. Pressure Tanks:*

All tanks under pressure except pressure of city water mains shall be made from such materials and so constructed in order to adequately withstand the pressure for which it is designed to be used and will not burst or explode under operations. Compliance in this respect with the current rules for the construction

of unfired pressure vessels of the American Society of Mechanical Engineers shall be deemed compliance by the employer with this rule.

*Rule 58. Pressure Tank Inspection:*

All pressure tanks operating on pressure other than from city water mains shall have a visual and hammer test inspection at least once a year by competent inspectors, or a hydrostatic test to 150 percent of normal working pressure.

*Rule 59. Pressure Units Using Reducing Valves:*

When pressure tanks or units operate at a reduced pressure and receive their pressure from a higher pressure source, a relief valve shall be used between the pressure regulator and the tank or unit. Such relief valve shall be set at not more than 25 percent above the working pressure of such tank or unit. Such relief valves shall be of the lever type and opened twice each working day to make sure the valve is not plugged up.

*Rule 60. Pressure Testing Units:*

When pressure testing units are used and operate at more than 20-lb. pressure above atmospheric pressure, such units shall be given a hydrostatic test every three months of 150 percent of operating pressure.

*Rule 61. Blowing Down Air Tanks:*

All compressed air tanks shall be blown down at least once every 24 hours to remove any moisture entrainment in the tank, unless such tank is equipped with a trap device that will automatically function to remove the entrained moisture.

*Rule 62. Safety Valves:*

All units or systems operating under pressure, such as compressed air systems, and the like, shall be provided with safety valves set to operate at the maximum operating pressure. Such safety valve shall be of a type that the valves can be tested periodically from outside the valve bonnet.

*Rule 63. Foot Protection from Falling Objects:*

All employees engaged in manual labor handling heavy objects, except molten metal, shall have their feet protected by metal toe caps or metal foot guards.

*Rule 64. Protective Covering:*

(a) *Protective Covering for Abrasive Cleaning Operations.* All operators who must work in the area in which dust and dirt are generated by abrasive cleaning operations, shall be provided with protective covering.

(b) *Covering for Acid and Chemical Operations.*

(1) *Protection Against Alkaline Solutions.* Where employees come in contact with alkaline solutions, the

operator shall be provided with fabric reinforced rubber gloves, and if there is a splashing hazard the operator shall be provided with rubber boots and rubber aprons that extend below the boot tops.

(2) *Covering for Acid Solutions.* Where employees come in contact with acid solutions, the operator shall be provided with fabric reinforced rubber gloves and if there are any splashing hazards the operator shall be provided with rubber boots and rubber aprons that extend below the boot tops.

#### *Rule 65. Eye Protection:*

(a) *Protection of Eyes Against Flying Objects.* All employees who are exposed to eye injuries by dust, flying chips or fragments, molten metal and from other causes shall be provided with spectacles or cup goggles properly fitted to their head, equipped with safety glass lenses or equivalent protective devices. Where eye correction is required for safety glass lenses, the same shall be ground to prescription specifications or suitable type of cover glass protection used.

(b) *Tests for Safety Lenses.* All lenses used for protection of eyes against flying fragments shall be strong enough to stand a drop test without fragmentation of a  $\frac{5}{8}$ -in. diameter steel ball dropped on the lens which is supported on a rubber faced steel block at a distance of 39.4". Compliance with the current rules for the specification of lenses of the U. S. National Bureau of Standards' specifications for head and eye protection Handbook No. H-24 shall be deemed compliance by the employer with this rule.

(c) *Protection of Eyes Against Acids and Chemicals.* All employees who are exposed to eye injuries from the splashing of acids or chemicals shall be provided with acid handlers' goggles equipped with impact resisting lenses.

#### (d) *Welders' Eye Protection.*

(1) *Types of Lenses to Be Used.* All welding operators shall be provided with goggles or helmets provided with windows or face shields provided with windows equipped with the proper shaded lens as to density and absorption in relation to visible and injurious light radiation as follows:

##### *Lens Shade No.*

A—(Medium) ; B—(Dark) ; C—(Extra dark) ; for electric fusion welding operation or employees near arc welding operations. Also for protection against glare or reflected light.

3—For more intense operations similar to No. A, B and C also light brazing operations.

4—For light acetylene operations such as burning, cutting and



5—For a little heavier acetylene work than No. 4.

6—General acetylene welding operations and maintenance work, also setup work on electric arc welding.

8—Heavy acetylene welding and cutting and electric metallic arc welding up to 20 amperes. Also for carbon arc observation.

10—Electric metallic arc welding up to 250 amperes.

12—Electric metallic arc welding for more than 250 amperes. Also atomic hydrogen welding.

14—Electric carbon arc welding.

(2) *Additional Eye Protection.* All welding operators and helpers shall be provided with protective goggles which are fitted with clear or filter lenses to prevent injurious light rays, or impact from injuring the eyes when the regular welding eye protection is removed.

(e) *Furnace Operators' Eye Protection.* All operators and helpers on electric melting furnaces and on any other type of furnaces that create an intense glare, shall be provided with eye protectors with suitable filter lenses to eliminate eye strain and damage caused by injurious light rays and heat.

(f) *Lenses to be Securely Held in Place.* Lenses shall be firmly held in place in the eye wire, cup, or frame to prevent rotation and thereby eliminating changing prismatic effect and to provide for lens retention in the event of fracture.

#### *Rule 66. Water Supply for Removing Acid or Chemical Splashes:*

Wherever employees work on alkaline or chemical operations, a portable source of water of at least a  $\frac{3}{4}$ -in. pipe size of not over 25-lb. pressure equipped with a quick acting valve shall be provided in close proximity to the operations, with which the operator's eyes or body may be thoroughly washed with water in case of accidental splashing.

#### *Rule 67. Respiratory Protective Equipment:*

(a) *Abrasive Cleaning Operations.* All operators who must work in the direct presence and in contact with the dust and dirt generated from the abrasive cleaning operations shall be provided with fresh air supplied airline helmets or masks.

The helmets or masks shall be provided with a supply of fresh filtered air and if such air is cold, due to climatic conditions, the air shall be heated to at least 65 degrees F. before entering the helmets or masks. Compressed air shall not be used as a fresh air supply in the helmets or masks unless an adequate air filter is provided to remove all dust and carbon monoxide.

All such helmets and masks shall be so constructed that the operator's breathing zone will not be contaminated with

dust from such cleaning operations. Compliance in this respect with the current rules for fresh air supplied helmets and masks of the United States Bureau of Mines shall be deemed compliance by the employer with this rule.

*Rule 68. Hand Tools:*

All hand tools shall be kept properly dressed and free from mushroomed heads.

*Rule 69. Electrical Installations:*

All electrical equipment, wiring, switches, motors and all other electrical equipment shall be of a safe type and installed in a safe manner to prevent injury to employees. Compliance in this respect with the current rules of the National Electrical Code of the National Fire Prevention Association shall be deemed compliance by the employer with this rule.

*Rule 70. Grounding Portable Electric Equipment:*

All portable electrically driven equipment shall be electrically bonded and permanently and effectively grounded to a metallic underground water pipe system or equivalent grounding electrodes.

### SECTION 3. GENERAL RULES AND REGULATIONS FOR THE PREVENTION OF INJURY TO THE HEALTH OF EMPLOYEES.

*Rule 1. Scope:*

These rules and regulations shall apply to all operations as defined in Section 1, Rule 1, that produce any dusts, gases, vapors, or fumes that create a hazard to the health of employees employed therein.

*Rule 2. Methods of Controlling Dust, Gases, Vapors or Fumes:*

Every process which generates dust, gases, vapors or fumes into the breathing zone of employees wherein the contaminated substance is injurious to the health and is conducive to bodily harm shall be provided, whenever the nature of the process permits without defeating the purpose of the process, with exhaust hoods or enclosures to control the contaminating substances to reduce its dispersion into the breathing zone to a minimum. If the nature of a process does not permit the application of an exhaust hood or enclosure, one or more of the following methods or devices shall be employed to reduce the dispersion of the contaminated substance into the breathing zone of the employee:

- (a) General ventilation increased in excess of that required under Sec. 2, Rule 2.

- (b) Wetting.
- (c) Oiling.
- (d) Timing of process so as to reduce to a minimum the number of employees exposed.
- (e) Isolation of the process.
- (f) Personal respirators protective equipment.

*Rule 3. Storage of Materials and Equipment:*

Materials and equipment which may accumulate dust and which are not used routinely shall be stored when not in use in segregated storage areas which shall be provided for this purpose.

*Rule 4. Good Housekeeping:*

Good housekeeping shall be maintained at all times and shall include cleaning and removal of dirt and waste materials accumulated on floors, super-structures, and equipment.

*Rule 5. Exhaust Systems:*

All exhaust systems shall include hoods or enclosures properly designed, at the points of generation of dusts, gases, vapors, or fumes, and connected by means of suitable exhaust piping to air-flow producing equipment, and when necessary air cleaning equipment, and shall be discharged out of doors.

*Rule 6. Hoods and Enclosures:*

Every exhaust hood and enclosure shall be so designed, located, and placed, that the air borne dusts, gases, vapors, or fumes generated will fall or be projected or drawn into the hood or enclosure in the direction of air flow, and all hoods shall be constructed so as to provide the greatest possible enclosure in the zone of dust, gas, vapor, or fume generation consistent with the conduct of the process. All air movement from open doors, windows, moving machinery and the like which tends to disperse such harmful substances generated by the equipment or process into the general atmosphere shall be eliminated or controlled. Hood openings and connections to branch pipes shall be shaped so as to minimize the orifice and resistance losses due to the flow of air into the system. All hoods and enclosures shall be free of burrs and sharp edges.

*Rule 7. Rate of Air Flow Through Hoods and Enclosures:*

The rate of air flow into every hood and enclosure shall be sufficient to control the harmful air borne dusts, gases, vapors, or fumes in accordance with the following requirements:

- (a) *Enclosed Shakout Grates.* Enclosed shakeout grates shall be ventilated at a rate of not less than 200 cu. ft. per minute per sq. ft. of open area into the enclosure.



(b) *Side Hoods on Shakeout Grates.* Side hoods on shakeout grates shall be provided with a total rate of ventilation of not less than 400 cu. ft. per sq. ft. of gross grate area.

(c) *Shakeout Grate Enclosed on Any Two Sides.* Any shakeout grate enclosed on any two sides in which the enclosure covers a projected area of the grate surface by at least  $33\frac{1}{3}\%$  shall be provided with ventilation of not less than 275 cubic feet per minute per sq. ft. of gross grate area.

(d) *Permanently Located Sand Mixing Equipment.* Permanently located sand mixing equipment shall be enclosed and ventilated at a rate of not less than 100 cubic feet per minute per sq. ft. of open area, including loading and inspection openings.

(e) *Sand Handling and Preparation Equipment.*

(1) *Handling Sand of Less Than 2% Moisture-Content.* Foundry sand handling and preparation equipment located inside of buildings in which the sand handled contains less than 2% of moisture by weight, shall be enclosed as completely as possible and shall be provided with exhaust ventilation at the following rates:

(2) *Flat Deck Screens.* The rate of ventilation for flat deck screens shall be not less than 50 cubic ft. per minute per sq. ft. of screen area, and the air velocity through the enclosure openings shall be not less than 200 linear feet per minute.

(3) *Cylindrical Screens.* The rate of ventilation through cylindrical screens shall not be less than 100 ft. per minute per square ft. of cylindrical screen cross section.

(4) *Conveyor Belts.* Exhaust hoods over loading and discharge points on conveyor belts shall be ventilated at a rate of not less than 300 cu. ft. per minute per foot of belt width and the air velocity through the net open area of the hoods shall not be less than 150 linear ft. per minute. When dust is released from belts at points other than loading or discharge points, they shall be provided with belt wipers or enclosed or otherwise controlled to prevent the dissemination of dust.

(5) *Bucket Elevators.* Bucket elevators shall be enclosed and the point of discharge shall be hooded and provided with ventilation at a rate of not less than 100 linear ft. per minute.

(6) *Storage Bins.* Storage bins located inside which have openings that emit dust shall be ventilated so as to maintain a negative pressure within the enclosure.

(f) *Tumbling Mill Ventilation.*

(1) *Stave Type Mills.* Tumbling mills of the stave type shall be housed in ventilated enclosures. The rates of ventilation shall be not less than the following:

Inside Dimension of Stave Mill Not Over 70 in. Inside Length		Cubic feet of air to be ex- hausted per minute for Mills Not Over 70 in. Inside Length
Side of Square Mill	Diameter of Round Mill	
..... Up to 24 in. inclusive	Up to 24 in. inclusive	800
Up to 24 in. inclusive	30 in. "	900
Up to 30 in. "	36 in. "	980
Up to 36 in. "	42 in. "	1335
Up to 42 in. "	48 in. "	1747
Up to 48 in. "	54 in. "	2210
Up to 54 in. "	60 in. "	2725
Up to 60 in. "	66 in. "	3300
Up to 66 in. "	72 in. "	3925
Up to 72 in. "	.....	4610

For mills in between the sizes listed above, the amount of air handled per minute shall be increased in proportion to the difference in size and volume of air and such amount of air thus obtained, added to the nearest smaller size listed above.

For mills longer than 70 inches the rate of ventilation shall be increased over the above values in direct proportion to the increase in length.

The air intake into the mill housing or enclosure shall be located at the front and bottom of the enclosure and shall be of such size that the average air velocity is not less than 400 feet per minute throughout the air intake opening.

(2) *Internally and Duct Ventilated Types of Mills.* Mills of the internal ventilated type in which air is drawn into the mill proper and mills of the duct ventilated type in which the dust is picked up in ducts located on the shell of the mill shall be ventilated at the following rates:

Inside Dimension of Mill		Cubic feet of air to be exhausted per minute	Diameter of branch pipe to give required rate of ventilation of 5000 linear feet per minute velocity
Side of Square Mill	Diameter of Round Mill		
..... Up to 24" inclusive	Up to 24" inclusive	430	4"
Up to 24" inclusive	30" "	680	5"
Up to 30" "	36" "	980	6"
Up to 36" "	42" "	1330	7"
Up to 42" "	48" "	1750	8"
Up to 48" "	54" "	2200	9"
Up to 54" "	60" "	2730	10"
Up to 60" "	66" "	3300	11"
Up to 66" "	72" "	3920	12"
Up to 72" "	...	4600	13"

(3) *Velocity in Mill Branch Pipes.* The air velocity in the branch exhaust pipe connected to mills of the internally ventilated and duct ventilated types shall be not less than 5000 linear feet per minute and in the main exhaust pipe to which these branch pipes are connected the velocity shall not be less than 4000 linear feet per minute.

(g) *Grinding, Polishing and Buffing Wheel Ventilation.* Grinding, polishing and buffing wheel operations shall be ventilated in accordance with the effective rules promulgated by the Illinois Industrial Commission and known as Part "C."

(h) *Abrasive Blasting Rooms.* Abrasive blasting rooms shall be totally enclosed, except for the air intakes, and shall be provided with downdraft ventilation of not less than an average of 80 ft. per minute over the entire projected floor area of the room. Air inlets shall be located in the ceiling and spaced to provide uniform distribution of air flow to the cross-sectional area of the room. Arrangement of the air inlets shall be such as to give an inlet velocity of not less than 300 ft. per linear feet per minute. Such inlets shall be provided with baffles to prevent the escape of abrasive particles or dust.

The operators of the abrasive blasting room shall be provided with personal respiratory protection of the positive pressure type.

(i) *Rotary Abrasive Blasting Tables.* Rotary abrasive blasting tables shall be enclosed and all openings effectively curtained and ventilated at a rate of not less than 200 cu. ft. per minute per square foot of gross open area without the curtains in place.

(j) *Abrasive Blasting Hand Cabinets.* Abrasive blasting hand cabinets shall be ventilated with an air velocity of not less than five hundred (500) linear feet per minute through all operating openings.

The amount of air exhausted from the cabinet shall be at least twenty times the volume of the cubical contents of the cabinet per minute.

(k) *Other Equipment.* For any machine or process not specifically listed, the rate of ventilation shall be such that an entering flow of air into the ventilating system is maintained for the operation of the machine or process of not less than the minimum velocity required to prevent the dispersion of harmful dusts, gases, fumes, or vapors.

#### *Rule 8. Exhaust Piping Systems:*

(a) *Size of Pipes.* The size of every branch pipe and every section of main pipe shall be determined so as to meet the following requirements:

(1) The minimum rate of air flow as required under Section 3, Rule 7, of this Part "F," shall be provided through each hood or enclosure.



(2) *Air Velocities.* In the case of an exhaust system collecting dust or other particulate matter, except where the collected material is conveyed by gravity or mechanical means, the air velocity in the exhaust pipes shall not be less than the minimum velocity required to transport the collected matter to the air cleaning equipment. The maximum velocity in the system shall not exceed the minimum velocity by more than 20% where higher velocity is used for the specific purpose of balancing the air flow through the system; exhaust systems handling fumes or vapors or dust exhaust systems in which the collected material is conveyed by gravity or mechanical means may operate at such velocities that will maintain the degree of control required to remove any hazard to the health of the employee.

(3) *Capacity of an Exhaust System.* The capacity of an exhaust system shall be calculated on the basis of all hoods connected to the system being open.

(4) *Piping Locations.* Exhaust piping shall be located so as to require the minimum length of pipe and number of bends.

(5) *Piping Clearance from Combustible Materials.* All piping shall be kept at least 6" from the floor and from any combustible material.

(6) *Location of Piping for Inspection and Protection Against Damage.* Piping shall be located so as to be accessible for inspection and maintenance and protected against external damage.

(7) *Passage of Piping Through Fire Walls.* When ventilating and exhaust piping pass through fire walls, the piping shall be provided with automatic fire doors or fire dampers on both sides of the fire wall through which it passes.

The fire doors and fire dampers shall be arranged to close automatically and remain tightly closed upon the operation of a fusible link or other suitable heat actuated device located where readily affected by an abnormal rise of temperature in the piping. Hinged dampers shall be equipped with spring catches and the pins of hinges shall be of corrosion resistant material. The fire doors shall be of metal-clad construction and the fire dampers shall be made of steel or heavy rigid asbestos sheets that will resist the passage of fire through the piping at fire walls. Compliance in this respect with the current rules of the National Fire Prevention Association shall be deemed compliance by the employer with this rule.

(8) *Materials of Construction.* All pipes shall be constructed of not less than the following gauges of metal; or other material of equivalent strength:

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Diameter of Pipe, Inches	U. S. Standard Gauge to be used for Abrasive Dusts	U. S. Standard Gauge to be used for Non- Abrasive Dusts, Fumes, Vapors
Up to 8" inclusive	20	24
Over 8" to 18" inclusive	18	22
Over 18" to 30" inclusive	16	20
Over 30"	14	18

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(9) *Elbows and Bends.* All elbows and bends shall be made from material at least two gauges heavier than is required to straight piping of the same diameter, except that for No. 14 gauge and heavier, the elbows and straight pipe may be of the same gauge.

(10) *Material.* Exhaust piping shall be of galvanized or painted black sheet iron or other materials of required strength, corrosion and abrasion resisting properties.

(11) *Longitudinal Joints.* All longitudinal joints or seams, except of welded construction, shall be double locked or lapped one inch and riveted with rivet centers not more than three inches apart.

(12) *Girth Joints.* All girth joints of pipe, except joints of butt welded or flanged construction, shall be made so that the outlet end of one length fits into the inlet end of the next length in the direction of air flow. The minimum length of lap shall be one and one-quarter inches and rivets shall be provided at not more than four and one-half inch centers. There shall be not less than four rivets in any girth joint.

(13) *Elbow Construction.* Elbow joint construction shall conform to the above Rules 11 and 12 of this Section.

(14) *Spot Welding.* Spot welds may be used in place of rivets in equal numbers provided steel to steel fusion at each weld is secured.

(15) *Joints.* All joints, other than those continuously welded, or flanged, shall be soldered air tight, except that field joints or connections may be closed with joint cement.

(16) *Flanged Joints.* Flanged, gasketed and bolted girth joints may be used in place of lapped and riveted joints and such joints are required where pipe sections are to be removed for inspection and cleaning.

(17) *Telescopic Joints.* Telescopic joints, employed to permit raising and lowering hoods, shall have the smaller pipe connected to the hood with a sliding fit inside the larger connecting pipe. The inside pipe shall extend into the outside pipe at least one pipe diameter, but never less than six inches when extended to maximum position. The end of the outside pipe should have a reinforcing band or bead and all parts shall be free from burrs, projections and sharp edges.

(18) *Horizontal Pipe Supports.* All horizontal runs of pipe including branch pipes extending more than three feet shall be securely supported. Such supports shall be not over twelve foot centers for pipes eight inches or smaller, and twenty foot centers for larger pipes.

(19) *Vertical Pipe Supports.* All vertical runs of branch pipes subject to vibration and movement shall be securely supported laterally by band steel or rods.

(20) *Outside Piping.* All exhaust piping hung on the outside of a wall immediately adjacent to a public road or street shall be securely supported, and permanently fastened to the structure.

(21) *Cleanout Openings.* In dust exhaust systems, cleanout openings shall be provided in all horizontal runs of pipe wherever dust settlement is likely to occur and shall always be provided near bends, pipe junctions and vertical runs of pipe. Cleanout openings shall be of a size that will permit ready access to the interior of the pipe. Removable caps shall be installed at all tail ends.

Where piping is constructed with flanged joints for purposes of cleaning, inspection openings shall be provided in such piping in place of regular cleanouts.

Wherever practical, cleanout openings should be located on under side of pipe and must offer no obstruction on the inside of the pipe.

(22) *Branch Pipe Junctions to Main Pipe.* Junctions shall be made at an angle not greater than  $45^{\circ}$ , and should for least resistance and best practice be  $30^{\circ}$  or less, measured on the center line of the two pipes.

(23) *Location of Junctions.* Junctions shall be made at the side or top of the larger end of a transformation piece, except that for specific reasons of balancing the flow, junction may be made with the main pipe section of uniform pipe diameter.

(24) *Number of Junctions.* Not more than one branch pipe shall enter the main pipe at the same point of intersection, except at a terminal end.

(25) *Transformation Pieces.* Transformation pieces shall be tapered at an included angle not greater than  $30^{\circ}$ .



Transformation pieces shall increase in area by an amount necessary to maintain the air velocity required in the system, and shall be constructed of material equal in gauge to the material of the connecting pipe at the large end.

(26) *Bends.* Round elbows shall be of at least five-piece construction for pipes six inches in diameter or less, and of seven-piece construction for larger pipes, with a throat radius equal to one and one-half to two times the pipe diameter unless space prohibits the use of such radii. Elbows made of a continuous piece, or ventura shaped elbows may be substituted for the five or seven-piece rule.

(27) *Dampers and Gates.* The use of dampers or gates or orifice plates shall not be permitted in an exhaust system unless provided for the specific purposes of balancing the air flow in the system and then they shall be riveted or permanently fastened to prevent any further manipulation unless minor manipulation is required for a controlled process.

(b) *Air Cleaning Equipment.*

(1) *Air Cleaning Equipment.* The capacity and operating characteristics and collection efficiency of the air cleaning equipment shall be such as to insure its continuous operation without loss of efficiency of the exhaust system.

(2) *Removal of Collected Material.* Means shall be provided for the removal and disposal of the collected material at regular intervals so as to insure the proper functioning of the equipment. The collected material shall be confined during its removal from the air cleaning equipment to the point of disposal or otherwise controlled so as to prevent the dissemination of dust in concentrations.

(3) *Construction.* The air cleaning equipment shall be constructed and supported to withstand abrasion, vibration and pressure, and if located out of doors to withstand wind pressures.

(4) *Location of Discharge.* No recirculation of the discharged air from an exhaust system shall be permitted. The point of discharge in the exhaust system shall be located above the roof of any adjacent buildings.

(c) *Air Flow Producing Equipment.*

(1) *Size and Capacity.* Every exhaust system shall be connected to an exhaust fan or air flow producing equipment that will maintain the required rate of air flow in all parts of the exhaust system. Every fan or air flow producing equipment shall be of a type and size suitable for handling the dusts, gases, vapors or fumes to be exhausted. Where conditions permit, the exhaust fan shall be located beyond the air cleaning equipment so as to handle clean air.

(2) *Speed of Operation of the Air Flow Producing Equipment.* The speed of the exhaust fan or air flow producing equipment shall be determined to create the required rate of air flow operating against the total resistance pressure of the exhaust system.

(3) *Connection of Air Flow Producing Equipment to the Exhaust System.* In all dust exhaust systems, the fan shall be connected to the inlet pipe by a split sleeve or fan drawband not less than 18" long securely fitted to prevent air leakage. This provision shall not apply when the fan or air flow producing equipment is located at the end of the system or otherwise can be readily disconnected from the system for inspection.

(d) *Fresh Air Inlets.* Fresh air inlets shall be provided in every room in which an exhaust system is located for the admission of make-up air to replace that removed by the exhaust system unless other air is supplied to the room by the heating system or other means. The velocity and temperature of the incoming fresh air shall be such as not to create excessive drafts. When the capacity of the exhaust system is small, the use of windows, doors, and other building openings for the admission of fresh air shall be permissible in place of special fresh air inlets.

(e) *Weather Caps.* A weather cap of low resistance design, or other suitable means of protecting the discharge pipe against the entrance of rain or snow, shall be provided on every vertical outside discharge pipe, except that no such protection shall be required when no damage to the exhaust system will result from the entrance of rain or snow.

(f) *Workmanship.* All exhaust systems shall be constructed of the materials and in the manner herewith required and set forth and also shall be installed in a permanent and workmanlike manner. Every effort shall be made to have the interior of all parts of the system smooth and free of obstructions in order to minimize resistance to the air flow. All parts of the system shall be as free as possible from air leakage either into or out of the system except at points where air is taken into or discharged from the system by design.

#### *Rule 9. Requirements for Wet Method of Dust Control:*

(a) *Application of Wet Methods.* The wet method of dust control shall include an adequate and continuous supply of water delivered into the plant under proper pressure and distributed through a piping system and terminating in suitable water sprays or jets at the several points of application, or shall provide the same facilities by means of a self-contained recirculating system. The application of water must not create a slipping hazard or increase the danger of metal spattering.

(b) *Application of Water.* The water sprays or jets shall be designed to break the water streams into small droplets or otherwise to provide effective wetting with as little exposure of the operators to the water sprays as possible. Protective baffles shall be installed or protective covering furnished by the employer where necessary to prevent wetting the operator.

(c) *Potability of water.* When the water used for dust control purposes is not potable, it shall not be cross-connected with the drinking and bathing water supply, and warning signs of sufficient size against drinking the water shall be prominently displayed and maintained on every water outlet.

(d) *Pipe Sizes.* The rate of water flow required at each point of application shall be adequate at every spray nozzle or jet when the system is in full operation.

(e) *Drainage.* Suitable drainage means shall be provided for the removal of water and sludge which drains from the operation.

(f) *Portable Sprinklers and Hoses.* Portable hand water sprinklers or hose sprinklers shall be used for damping dusty gangways and for other operations where the control of dust dissemination is not possible by other methods.

*Rule 10. Requirements for General Ventilation:*

(a) *General Ventilation.* General ventilation shall not be employed as the principal means of control, except in the case of operations carried on over the entire floor and segregated operations which require infrequent attention.

(b) *Location of General Ventilation Equipment.* Facilities for general ventilation shall include mechanical or natural-draft ventilators of proper capacity and suitably located with reference to sources of contamination and fresh air inlets to insure the removal of contaminated air from the building without causing short-circuiting. The size of fresh air inlets shall be sufficient to provide make-up air for general ventilation as well as local exhaust ventilation.

(c) *Capacity.* The capacity of individual general ventilating units shall be designed to meet the varying requirements throughout the foundry.

(d) *Respirators Protective Equipment.*

(1) *Respiratory Protective Equipment.* Respiratory protective equipment alone shall not be depended upon to protect employees against dusts, fumes, gases, and vapors in foundries, except in cases of isolated or infrequent operations. Respiratory protective equipment may be used in connection with other methods of control only when the latter cannot be made to develop the required degree of control and cannot be replaced by other effective methods.



(2) *Approved Respirators.* All respiratory protective devices shall be of a type and of such safe construction, protection and operation, so as to protect the employees from the hazard. Compliance with the minimum requirements of the U. S. Bureau of Mines for similar equipment for the particular hazards to be guarded against shall be prima facie evidence of conformity.

(3) *Cleaning of Respiratory Protective Equipment.* The employer shall provide every employee requiring personal respiratory protective equipment with at least one such device suitably identified, and the employer shall further supply and employ facilities for the inspection, cleansing, and repair at least daily of all respiratory protective equipment when in use. All such equipment, when not in use, shall be stored in closed containers.

**PART "G"**  
**Effective September 1, 1944**  
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## PART "G"

### RULES AND REGULATIONS

#### Relating to

#### INDUSTRIAL HOUSEKEEPING AND SANITATION, AND WASH, LOCKER, REST, TOILET AND LUNCH ROOM REQUIREMENTS

#### SECTION I. SCOPE AND DEFINITIONS

##### *Rule 1. Scope:*

These rules and regulations for industrial housekeeping and sanitation, and wash, locker, rest, toilet and lunch room requirements shall apply to any plant, factory or other work place wherein labor is regularly employed in the production, servicing, altering, handling, transporting, erecting, disassembling or wrecking of commodities and materials as differentiated from commercial and nonproductive enterprises such as retail store, professional, financial and office operations other than plant and factory office, with the following exceptions:

(a) *War Conditions.* It shall be deemed that an employer is complying with any of these rules, specifications and regulations as set forth if he has made an effort to comply with them but has been denied a priority by competent federal authority to obtain the necessary materials and equipment by virtue of limitations imposed upon employers beyond their control because of the war which is going on at the time of the adoption of these code rules.

(b) *Other Governmental Supervision.* If local ordinances are more strict than these rules, specifications and regulations, concerning any specific subject, the local ordinances shall be followed. Parts of this code that are in conflict with the rules, specifications and regulations of any governmental agency that has jurisdiction or supervision over the control or conduct of any work place or operation shall not be enforced.

##### *Rule 2. Definitions:*

(a) *Foot Candle.* A foot candle means the amount of illumination at a point on a plane 1-foot distant from a source of 1-candle power and perpendicular to the light rays at this point.

(b) *Mechanical Air Supply.* Mechanical air supply shall mean a system of ventilation where the air is taken from the out-of-doors and forced into the room or work place through windows, doors, skylights, transoms, shafts, ducts, ventilating and other openings and/or a mechanical exhaust system, and such air so supplied shall be tempered and distributed in such room or work place as not to cause discomfort to the employees except that when a mechanical ventilating system or air-conditioning system is used, not more than two-thirds ( $\frac{2}{3}$ ) of the mechanically supplied air to the room or work place may be recirculated, provided means are employed to control the temperature, humidity, odors and dusts, and such quantities of recirculated air may be considered as mechanically exhausted from such room or work place, except that no air shall be recirculated from any toilet, wash, locker, rest room or kitchen, or from any other room where such air might be contaminated by gases, dusts or smoke, excepting tobacco smoke, that might be noxious, dangerous or detrimental to the health of employees.

(c) *Mechanically Exhausted.* Mechanically exhausted shall mean a system of ventilation where air is mechanically removed from the room or work place by means of power, and discharged out-of-doors in such a manner that the exhausted air cannot re-enter the room or work place or adjacent buildings, combined with a supply of air through windows, doors, skylights, transoms, and ventilating and other openings and/or a mechanical air supply system, except that when a mechanical ventilating system or air-conditioning system is used, not more than two-thirds ( $\frac{2}{3}$ ) of the mechanically exhausted air may be recirculated provided means are employed to control the temperature, humidity, odors and dusts, and such quantities of recirculated air may be considered as mechanically exhausted in such room or work place, except that no air shall be recirculated from any toilet, wash, locker, rest room or kitchen, or from any other room where such air might be contaminated by gases, dusts or smoke, excepting tobacco smoke, that might be noxious, dangerous or detrimental to the health of employees.

(d) *Natural Ventilation.* Natural ventilation shall mean a system of ventilation, the effectiveness of which depends upon natural atmospheric conditions and upon the operation of windows, doors, ventilating and other openings, which are in the control of the person or persons in the room or work place.

(e) *Net Open Area of Windows, Ventilating Openings, Etc.* The net open area of windows and ventilating openings shall mean the net open area that such windows and ventilating openings can be opened to the out-of-doors.

(f) *The Projected Area of Doors, Windows and Other Openings.* The projected area of doors, windows and other



openings shall mean the gross area of the openings provided in the out-of-doors surfaces of the buildings for such openings.

## SECTION II. HOUSEKEEPING

### *Rule 1. Housekeeping:*

Plants, factories and other work places, in order to provide reasonable protection for the health and safety of persons employed, shall be maintained in a clean and sanitary manner.

### *Rule 2. Storage:*

All product, supplies, material, parts or equipment shall be stored in places provided for them consistent with good practices prevailing in similar operations and shall be piled in such a manner as not to cause an accident to any person.

### *Rule 3. Accumulation of Refuse:*

Accumulation of refuse and by-products of operations shall not be allowed to the extent that such accumulations would affect the safety or health of workers.

### *Rule 4. Safe Disposal of Refuse:*

Combustible or explosive refuse or by-products and unused materials shall be disposed of daily in a safe manner in order to eliminate exposures to fire, accident and health.

### *Rule 5. Conditions of Floors:*

All floors used by employees shall be maintained in good repair. All aisles, gangways and passageways regularly used by employees shall be maintained in good repair and shall be kept free of obstructions to prevent employees from tripping and falling.

### *Rule 6. Care of Floors:*

The floors of all buildings in which employees work shall be maintained in a clean condition, and as far as possible, in a dry condition, consistent with the type of operations carried on. Where wet processes are regularly carried on, causing wet floor conditions, the floors shall be drained or false floors, platforms, mats or other dry standing places provided.

### *Rule 7. Sweeping and Cleaning:*

The sweeping and cleaning of floors, walls, ceilings, structural parts of the building, equipment, fixtures and other contents of work rooms shall be done in such a manner as to prevent quantities of harmful dust contaminating the breathing zone of the employees, but where it is impractical to perform such cleaning operations without affecting the employees, respirators shall be furnished to the employees in the affected areas and all such respirators shall meet the current minimum requirements of the United States Bureau of Mines for similar equipment for the particular hazards to be guarded against.

*Rule 8. Expectoration:*

Where cuspidors or receptacles are provided for expectoration, they shall be of such construction that they can be readily cleaned and disinfected; and they shall be cleaned at least daily, if used, to prevent them from becoming a menace to health.

*Rule 9. Eating in Certain Workrooms Prohibited:*

The employer shall not allow employees to lunch on their job, nor shall milk, coffee or soft drinks be brought to the job in work-room areas where processes produce toxic dusts or fumes that can be conveyed to the human system by way of the mouth. Employees working in such contaminated areas shall be required to wash before eating, and the employer shall be required to provide a locker room with benches, or a lunch room or other equally suitable place for use of the employees for eating purposes.

## SECTION III. VENTILATION

*Rule 1. Cubic Feet of Air Space per Employee in Working Areas:*

All work rooms in which employees regularly work, other than rooms used primarily for storage, warehouse purposes and cold storage, and rooms in which the air temperature or humidity is controlled because of an essential process, shall have not less than two thousand (2,000) cubic feet of air space per person regularly employed, based on gross cubical contents, provided the total projected area of doors and windows opening to the out-of-doors is not less than twelve-and-a-half ( $12\frac{1}{2}$ ) per cent of the gross floor area of the work room, except that for every one (1) per cent or fraction thereof the projected area of doors and windows opening to the out-of-doors is greater than twelve-and-a-half ( $12\frac{1}{2}$ ) per cent, the volume of air required per person may be reduced one hundred and thirty-five (135) cubic feet from the two thousand (2,000) cubic foot requirement, but in no event shall the volume of air space per person be less than one thousand (1,000) cubic feet because of greater door and window areas; otherwise a system of mechanical air supply shall be provided.

*Rule 2. Mechanical Air Supply Requirements in Working Areas:*

Where there is less than two thousand (2,000) cubic feet of air space per person regularly employed in a work room, except as provided for in Rule 1 of this section, or where the total projected area of all doors and windows opening to the out-of-doors is less than twelve-and-a-half ( $12\frac{1}{2}$ ) per cent of the gross floor area of the work room, there shall be mechanically supplied, an amount of clean tempered air on the basis of one of the two following rules, whichever gives the greater amount of air supply:

- (a) When the air space per person regularly employed in the work room is less than two thousand (2,000) cubic feet, there shall be supplied two (2) cubic feet of air per minute

per person for each one hundred (100) cubic feet of air space or fraction thereof less than two thousand (2,000) cubic feet per person.

(b) When the projected area of all doors and window openings to the out-of-doors is less than twelve-and-a-half ( $12\frac{1}{2}$ ) per cent of the gross floor area of the work room, there shall be supplied two and four-tenths (2.4) cubic feet of air per minute per person, for each one (1) per cent or fraction thereof the projected door and window openings are less than twelve-and-a-half ( $12\frac{1}{2}$ ) per cent.

*Rule 3. Ventilation of Office, Toilet, Locker, Rest and Lunch Rooms:*

All offices, rest, toilet, locker and lunch rooms shall be provided with natural or mechanical ventilation to maintain healthful conditions during periods of occupancy, as per the following requirements:

(a) *Rooms with ventilation to the Out-of-Doors.* If offices, rest, locker and lunch rooms have windows or ventilating openings opening to the out-of-doors and the net open area of such windows and ventilating openings is not less than five (5) per cent of the gross floor area, no mechanical ventilation shall be required.

(b) *Rooms with Ventilation to the Out-of-Doors but with a Deficiency of Natural Ventilation.* If offices, rest and lunch rooms have less than five (5) per cent and more than two-and-a-half ( $2\frac{1}{2}$ ) per cent of the gross floor area represented by net window and ventilating openings opening to the out-of-doors, there shall be provided a mechanical supply of clean tempered air of not less than six-tenths (.6) cubic feet of air per minute per square foot of gross floor area. However, if the net open area of the windows and ventilating openings opening to the out-of-doors is less than two-and-a-half ( $2\frac{1}{2}$ ) per cent of the gross floor area, there shall be mechanically supplied, six-tenths (.6) cubic feet of clean tempered air per minute per square foot of gross floor area and there shall be mechanically exhausted, three-tenths (.3) cubic feet of air per minute per square foot of gross floor area.

(c) *Rooms without Ventilating Openings to the Out-of-Doors.* If offices, rest and lunch rooms are located in the interior of buildings and with no direct natural ventilation to the out-of-doors and which have less than five (5) per cent and more than two-and-a-half ( $2\frac{1}{2}$ ) per cent of the gross floor area of the room, represented by net window and ventilating openings opening to the building in which they are located, and if the net area of all windows and ventilating openings to the out-of-doors of that floor of the building plus the office, rest and lunch rooms is not less than five (5) per cent of the gross floor area, no mechanical ventilation shall be required. However, if the net open area of all windows and ventilating openings to the out-of-doors on the floor of the



building containing office, rest and lunch rooms is less than five (5) per cent of the gross floor area of the floor of the building including office, rest and lunch rooms, then there shall be mechanically supplied not less than one (1) cubic foot per minute of clean tempered air per square foot of gross floor area to such office, rest and lunch rooms, and there shall be mechanically exhausted one (1) cubic foot of air per minute per square foot of gross floor area.

(d) *Kitchens.* Where a room is used for kitchen purposes only, for the preparation of food for employees, there shall be mechanically exhausted, four (4) cubic feet of air per minute per square foot of gross floor space and if the net open area of windows and ventilating openings opening to the outside is less than three (3) per cent of the gross floor area of such kitchen, there shall also be mechanically supplied, one and two-tenths (1.2) cubic feet per minute of clean tempered air per square foot of gross floor area.

(e) *Toilet and Locker Rooms.* If the amount of net open area of windows and ventilating openings opening to the out-of-doors is less than five (5) per cent of the gross floor area of toilet and locker rooms, there shall be mechanically exhausted one and five-tenths (1.5) cubic feet of air per minute per square foot of gross floor area.

## SECTION IV. LIGHTING

### *Rule 1. Lighting Requirements:*

Where daylight does not provide sufficient illumination, artificial illumination shall be provided in all work areas and other parts of the buildings to which employees are accustomed to having access, to prevent accidents and give reasonable illumination, and such places shall be provided with artificial illumination, and such illumination shall be maintained in areas of occupancy of not less than the following average intensities, measured at floor level, unless otherwise noted:

Rooms and buildings used for storage and stocking of materials, and for warehouse purposes.....	Not less than 1½-ft. candles
Passageways, aisles and gangways not located in rooms illuminated for other purposes.....	Not less than 1½-ft. candles
Work places in which employees are engaged in manufacturing and kindred processes .....	Not less than 10-ft. candles measured at work level
Boiler and engine rooms.....	Not less than 5-ft. candles
Electrical substations and switchboard rooms.....	Not less than 5-ft. candles
Washrooms.....	Not less than 5-ft. candles
Locker rooms.....	Not less than 5-ft. candles
Rest rooms.....	Not less than 5-ft. candles
Toilet rooms.....	Not less than 5-ft. candles
Rooms used solely for lunch purposes..	Not less than 10-ft. candles
Kitchen.....	Not less than 10-ft. candles
Offices.....	Not less than 10-ft. candles

## SECTION V. WATER SUPPLY FOR HUMAN CONSUMPTION

### *Rule 1. Potable Water:*

A source of potable water shall be supplied for all purposes for human consumption, such as for drinking, cooking, washing and bathing purposes.

### *Rule 2. Water for Washing and Bathing:*

A supply of cold and hot water shall be provided for all lavatories in every wash room required under Section VII, Rule 1, and for all shower baths installed.

The temperature of the hot water shall be controlled to prevent scalding the employees, or hot and cold water shall be provided through double faucets or valves having a single discharge.

### *Rule 3. Provisions of Drinking Water:*

A supply of potable and cool drinking water shall be provided and made accessible to employees in working areas; also a supply of drinking water shall be provided in all rooms assigned for lunch purposes. No drinking water facilities shall be provided in toilet rooms and privies.

### *Rule 4. Method of Dispensing Drinking Water:*

(a) *Drinking Cups.* The use of common drinking cups is prohibited. However, individual paper drinking cups may be used, and a container shall be provided for the discarded cups. A container shall be provided for unused individual cups to protect them from dirt and soil before use.

(b) *Drinking Fountains.* Where a drinking fountain is provided it shall be constructed of impervious material with the water jet set at an angle, protected with a guard so that the water cannot fall back into the point of discharge. The nozzle or water jet shall be located at least three-quarters ( $\frac{3}{4}$ ) of an inch above the edge of the bowl or receptor, and the discharge nozzle shall be guarded so that the mouth or nose of the drinker shall be prevented from coming in contact with the discharge nozzle. The bowl or receptor shall be so proportioned as to catch all water issuing from the nozzle, and there shall be provided a waste pipe sufficiently large to carry off water promptly from the bowl and adequately trapped. The height of the drinking level of the fountain shall be convenient to the average person.

(c) *Other Methods of Supply Drinking Water.* Open containers such as barrels, pails or tanks for drinking water purposes from which water must be dipped, poured, whether fitted with cover or not, shall not be used, except that drinking water for mobile labor gangs such as labor construction crews, building crews and the like, may be supplied with portable pressure drinking fountains equipped with approved water jet as described in Rule 4 (b) of this section, and ther-

mos bottles may be used for drinking water for individual use by employees in remote and isolated places such as crane cabs and the like.

*Rule 5. Posting of Notices of Unsafe Water:*

Where water is not potable or fit for human consumption and is used for industrial processes, fire protection and the like, notices shall be posted at all water outlets where the water might be used for human consumption and such notices shall be not less than twelve (12) inches by twelve (12) inches in size, stating clearly that such water is unsafe and not to be used for drinking purposes.

*Rule 6. Cross Connections:*

There shall be no physical cross connections of contaminated water systems with potable water system within the plant property. Valves and check valves shall not be considered a means of separating a contaminated water supply from a potable water supply.

*Rule 7. Back Siphonage:*

No potable water supply system shall be connected to any tank, plumbing or other fixture or device where back siphonage may occur to contaminate the water system except in the following manner:

(a) *Lavatories and Sinks.* Where potable water supply systems is used for washing and bathing purposes the outlet of the faucets or the water supply to such lavatories and sinks shall not be less than one (1) inch above the rim.

(b) *Toilet and Urinals.* No potable water system shall be connected to a toilet or urinal except by means of a back flow preventer provided with the flush valve, or by means of a gravity flush tank where the outlet of the potable water system to such tank or the critical level of a backflow preventer is at least one (1) inch above the overflow and such overflow shall be capable of handling the maximum flow of water without the water level in the tanks reaching the supply outlet or critical level.

(c) *Other Equipment.* No potable water supply shall be directly connected to a water system used for the purposes that might contaminate the potable water system due to back siphonage, such as aspirators, syphons, ejectors, washers, processing tanks and the like. When water is required for other than potable use and the water supply is obtained from a potable water supply system, such requirements shall be taken from a surge tank which is supplied by the potable water system with the potable water supply pipe discharging not less than the equivalent of two (2) nominal supply pipe diameters and never less than six (6) inches above the rim of such surge tank.



## SECTION VI. TOILET ROOMS

*Rule 1. Toilet Rooms:*

Every employer shall provide toilet room facilities for employees except that privies may be used under certain conditions as specified hereafter.

*Rule 2. Toilet Rooms for Each Sex:*

Separate toilet rooms shall be provided for each sex when there are more than five (5) persons of either sex employed per working shift. There shall be no doors or openings of any kind connecting toilet rooms used by males and females. Toilet rooms shall be plainly marked "MEN" or "WOMEN". In toilet rooms used exclusively for females, covered receptacles shall be provided for the discarded personal hygiene requirements of the females, and the contents of such receptacles shall be disposed of daily.

*Rule 3. Toilet Room Construction:*

All new toilet rooms and any expansion or addition of toilet room facilities after the approval of this code by the Industrial Commission shall be constructed and arranged in accordance with the following requirements of this rule except as provided for in Rule 7 of this Section.

(a) *Walls.* The walls of toilet rooms shall extend to the ceiling of the building in which they are located, except that toilet rooms located in high vaulted areas shall have walls not less than eight (8) feet high and a complete ceiling built over the entire area of the toilet room and with the further exception that toilet rooms located on mezzanine floors or built in the roof trusses of buildings where there is no view from above into the toilet room from another elevation or crane and the like, shall have walls not less than eight (8) feet high, and no ceiling will be required.

(b) *Wall Materials.* The interior walls shall be built of solid construction to at least eight (8) feet above the floor line. Above the eight (8) foot line, materials may be used that are not transparent. Windows glazed with non-transparent glass shall be used in all exterior walls.

(c) *Floors.* Toilet rooms containing more than a total of two water closets or urinals shall have the floors and cove base constructed of materials which are water-tight and impervious to moisture. The cove base shall be integral with the floor and not less than six (6) inches high.

(d) *Location of Doors.* All doors for means of ingress and egress shall be provided with an automatic closing device. The doors of toilet rooms for males and females shall not be located closer than six (6) feet. The doors shall be so located that the toilet fixtures are not visible from the outside through the doors except that partitions may be located and built within at least one (1) foot of the floor and not less than six

(6) feet high to screen the interior of the toilet room from beyond the door view. Doors may be provided with glass that is not transparent.

(e) *Lavatories.* Every toilet room shall be provided with at least one (1) lavatory.

(f) *Facilities not Permitted.* No toilet room shall be used for locker space or for lunching. No drinking facilities shall be provided in toilet rooms. New toilet rooms built after the approval of this code by the Industrial Commission shall not have bathing facilities provided.

#### *Rule 4. Number of Water Closets:*

The number of water closets for each sex provided in existing or new toilet rooms shall not be less than indicated in the following table:

Number of Persons Working in any Single Shift			
Male	Number of Water Closets	Female	Number of Water Closets
1 to 9 inclusive.....	1	1 to 8 inclusive.....	1
10 to 24 inclusive.....	2	9 to 20 inclusive.....	2
25 to 49 inclusive.....	3	21 to 40 inclusive.....	3
50 to 74 inclusive.....	4	41 to 60 inclusive.....	4
75 to 99 inclusive.....	5	61 to 80 inclusive.....	5
Over 99.....		1 for each additional 30 persons	
Over 80.....		1 for each additional 26 persons	

#### *Rule 5. Installation of Water Closets:*

All water closets installed in new toilet rooms, and any additional water closets installed in existing toilet rooms after the approval of this code by the Industrial Commission shall be installed according to this rule.

(a) *Spacing of Water Closets.* Every water closet shall be within a compartment separated from the toilet room proper by means of partitions. The partitions shall be spaced not less than two feet eight inches (2-ft. 8-in.) apart and not less than four feet six inches (4-ft. 6-in.) front to back.

(b) *Construction of Water Closet Partitions.* Partitions shall be made of solid construction which can be readily cleaned and kept in a sanitary condition and shall be within twelve (12) inches of the floor and not less than six (6) feet high. A single or double door shall be located at the entrance of the water closet compartment and such door shall be provided with a lock or fastener on the inside.

(c) *Construction of Water Closets.* Water closets shall be constructed of vitreous china or other impervious material. The surfaces left exposed after installation shall have a glazed, smooth finish. The trap shall be made an integral part of the bowl and shall be so formed as to maintain a water seal two-and-a-half (2½) inches when filled to the overflow. Bowls shall embody an integral flushing rim constructed so as to wash the interior of the bowl at each flushing. The outlet of

the bowl shall be constructed to afford a gas-tight connection between the bowl and waste pipe. The water supply shall enter the bowl through the flushing rim in sufficient quantities to thoroughly remove all waste material at each single flushing, with sufficient clear water left within the bowl to form the necessary trap seal and water surface.

The installation or continued use of pan, plumber, wash-out, trough, range and long hopper water closets shall not be permitted.

Water closets, except those of the integral seat type shall be provided with an open front seat. The seat shall be constructed of or surfaced with non-absorbent material or finish.

*Rule 6. Number of Urinals:*

Urinals shall be installed on the basis of one (1) urinal for not less than ten (10) men or more than seventy-five (75) men regularly working on any one shift; and additional urinals shall be installed on the basis of one (1) urinal for each seventy-five (75) men per shift or fraction thereof.

*Rule 7. Installation of Urinals:*

Urinals shall be located in the toilet rooms, except if accessibility to the men working in certain areas is necessary they may be installed in an area not frequented by women. In such cases a partition extending to within one (1) foot of the floor and at least seven (7) feet high shall be built around the urinal. A self-closing entrance door shall be provided if the urinal is visible from outside the entrance to compartment. Not more than one (1) water closet may be installed with such urinal installation provided partitions are installed as required by Rule 5 (a) and (b) of this Section. Ventilation, heating and lavatory facilities shall not be required in such installations. No ceiling is required on such urinal and/or water closet compartment installations.

*Rule 8. Construction of Urinals:*

Urinals may be of the single-fixture type or trough type. Where the trough type is used, twenty-four (24) inches of trough shall be considered equivalent to one (1) urinal. Urinals installed after the approval of this code by the Industrial Commission shall be constructed of vitreous china or other impervious material; and the surfaces left exposed after installation shall have a glazed, smooth finish. The water supply for flushing purposes shall be of sufficient quantity to remove all waste material at each single flushing. Every urinal shall be provided with the necessary trap seal.

*Rule 9. Toilet Facilities Where There are No Sewer Connections:*

Toilet facilities may be installed where there are no sewer connections or septic tank facilities and it is impractical to install any sewer system, under the following conditions:



(a) *Privies for each Sex.* Privies shall be provided for each sex on the basis of the requirements under Section VI, Rule 4. Privies for each sex shall be plainly indicated.

(b) *Suitable Ground Conditions.* Privies may be installed where the character of the ground and seepage conditions will not contaminate water supply for human consumption. The pit for such privies shall be sheathed to prevent the sides of the earth from caving in.

(c) *Construction of Privy Vaults.* Where there is danger of contaminating underground water supplies, such privies shall be provided with a tight concrete or metal vault to receive the excreta, or removable tight cans shall be used.

(d) *Construction of Privy Superstructure.* All privies shall be constructed and maintained so that there will be no cracks or open spaces in that portion of the superstructure between the seat and the floor or between the floor, pit, vault, or space where the cans are kept.

Every privy shall be provided with a door, and such door shall be provided with self-closing device.

Lids over the seats shall be provided and so constructed as to fall in a closed position when the seat is not occupied. The pit, vault or pace under the superstructure shall be ventilated to the outside air by means of a stack protected at its outlet by fly screen. Every privy shall be ventilated by an opening to the outside, the lower portion of which is located at least six (6) feet above the floor line and containing not less than one (1) square foot of open area. Such ventilating openings shall be protected with fly screens.

(e) *Maintenance of Privies.* Privies shall be maintained in a sanitary condition. A covered receptacle shall be provided for lime or other deodorants and a scoop provided so that lime or other material may be sprinkled upon the excreta in the can, vault or pit below.

(f) *Chemical Closets.* Where chemical closets are installed they shall be constructed and maintained in a sanitary condition. The containers used under the seats shall be made of materials suitable for such use and the construction of such containers shall permit maintaining the containers in a sanitary condition.

Containers shall be charged with chemical solutions of the proper strength, and the contents of such container shall be thoroughly agitated each day when in use.

When the container is more than two-thirds ( $\frac{2}{3}$ ) full the contents shall be removed and disposed of in a manner that will not produce any unsanitary or dangerous conditions.

Vent stacks shall connect with the vault below the seat leading to the out-of-doors. The outlet of such vent stacks shall be covered with fly screen. Stacks shall be maintained in a clean and sanitary condition.

*Rule 10. Toilet Paper:*

Toilet paper shall be provided for each water closet, privy and chemical closet. A holder or retainer shall be provided for toilet paper at each facility.

*Rule 11. Toilet Room Temperatures:*

The temperature of toilet rooms other than privies during periods of occupancy shall not be less than 65° F.

## SECTION VII. WASH AND LOCKER ROOMS

*Rule 1. Wash and Locker Room Requirement:*

Wash and locker room facilities shall be provided for each sex when the number of either sex exceeds ten (10) regularly employed on any single work shift.

*Rule 2. Place to be Provided for Employees' Belongings:*

The employer shall furnish clothes racks, lockers, locker baskets or suspended devices, for every employee regardless of whether a wash and locker room is required. If lockers, locker baskets or other suspended devices are provided they shall be of a type that can be locked.

*Rule 3. Construction of Wash and Locker Rooms:*

All new wash and locker rooms, and any expansion of or addition to wash and locker room facilities after the approval of this code by the Industrial Commission shall be constructed in accordance with the requirements of this rule.

(a) *Construction of Wash Rooms.* If wash rooms are constructed as separate units they shall be constructed in accordance with Section VI, Rule 3, except that no ceiling shall be required.

(b) *Construction of Combined Wash and Locker Rooms and Separate Locker Rooms.* When wash and locker rooms are combined in a single unit or locker rooms are built as separate units, they shall be so constructed that the walls shall extend to the ceiling of the building in which they are located except that when located in high vaulted areas the walls may be less than eight (8) feet high, and the wash and locker room combination, or the locker room, completely sealed over to keep dust and dirt off the employees' belongings unless lockers are provided for the employees' clothing; then no ceiling shall be required unless a ceiling is essential to cut off view from above.

(c) *Floors.* The floors of combined wash and locker rooms and separate locker rooms shall be constructed of or covered with materials impervious to moisture so that they may be kept in a clean and sanitary condition.

(d) *Location of Doors.* All doors of combined wash and locker rooms and separate wash and locker rooms for means of ingress and egress shall be provided with automatic closing devices. The doors of wash and locker rooms for males and females shall not be located closer than six (6) feet apart. The doors shall be so located that the interior of the rooms is not visible from the outside through the doors except that partitions may be located and built within at least one (1) foot of the floor and not less than six (6) feet high to screen the interior of the room from beyond the door view.

Doors may be provided with glass that is not transparent.

Wash and locker rooms shall be plainly marked "MEN" or "WOMEN".

If wash and locker rooms are built as separate units or in combination, and adjoin toilet rooms, there shall be a connecting door between the facilities.

*Rule 4. Washroom Facilities.* Every washroom shall be provided with lavatories and/or shower baths as per the following:

(a) *Lavatories.* Lavatories shall be provided for employees per shift on the following basis:

<i>Number of Employees</i>	<i>Lavatories</i>
1 to 15 inclusive.....	1
16 to 30 inclusive.....	2
31 to 50 inclusive.....	3
For each additional 25 employees or fractional part thereof, there shall be provided.....	1 additional lavatory

The lavatories may consist of individual units or wash sinks or circular fountains. Where wash sinks or circular fountains are used, twenty-four (24) inches of outside rim of a wash sink and seventeen (17) inches of outside rim of a circular fountain shall be the equivalent of one (1) lavatory.

(b) *Construction of Lavatories.* All lavatories installed in new wash rooms, or any additional lavatories installed in existing wash rooms after the approval of this code by the Industrial Commission shall be constructed as follows:

Lavatories, wash sinks or circular fountains shall be constructed of vitreous china or other impervious material. The surfaces left exposed after installation shall have a glazed, smooth finish.

Individual lavatories may be equipped with a drain plug or stopper. Wash sinks and circular fountains shall not be equipped with a drain plug or stopper.

All lavatory facilities shall be equipped with hot and cold water faucets and wash sinks and circular fountains may be equipped with spray pipes provided with valves for controlling the hot and cold water supply. Spring-closing hand-operated faucets shall only be permitted in single lavatories provided with stoppers.



*Rule 5. Floor Space Required for Washroom Facilities:* All new washrooms and any expansion or addition of lavatories in washrooms after the approval of this code by the Industrial Commission shall have not less than thirteen (13) square feet of floor space provided per lavatory or its equivalent, including aisle space where only used for washing purposes exclusive of shower baths. If the washroom is consolidated with the locker room the figure of thirteen (13) square feet may be reduced, depending on the amount of adjacent aisle space common to both the locker room and the washroom.

*Rule 6. Shower Baths:*

Shower baths shall be provided for employees regularly engaged in operations where injurious and toxic liquids, chemicals and dusts are produced and come in contact with the bodies of the employees, or where the operations cause the bodies, except faces, hands and arms of the employees to become so covered with grime, dirt and grease that the street clothes of the employees become soiled when they change into them after the working shift. In such cases, shower baths shall be provided on the basis of one shower to each twenty (20) employees or fractional part thereof, and such showers shall be installed in accordance with the following:

(a) *Shower Bath Stalls.* Individual shower bath stalls installed after the approval of this code by the Industrial Commission shall not be less than thirty-two (32) inches wide and thirty-two (32) inches deep. Where batteries of showers are installed in a line, the shower heads shall be located on at least three (3) foot centers and no partitions need be provided separating the shower spaces.

(b) *Shower Bath Floor Construction.* The floors of all shower bath installations shall be constructed of materials impervious to water, and the floors shall be pitched to readily drain off into a floor drain. Where the floor connects with a wall, forming a part of the shower installation, a cove shall be made integral with the floor not less than six (6) inches high.

Means shall be provided in the surface finish of the floors, or coverings provided on the soapy floors in and around shower bath installations, such as mats, sheets of roofing paper and the like, to prevent employees from slipping and falling. Such anti-slip coverings shall be removed and cleaned at frequent intervals or new material laid on the floors.

(c) *Soap.* The employer shall provide soap for lavatories and shower baths. Where powdered or liquid soaps are used, suitable dispensers shall be provided for the kind of soap used.

The soap shall be of such composition and free from excessive amounts of abrasives that it shall not harm the skin of employees.

*Rule 7. Locker Room Equipment:*

The equipment provided in locker rooms for employees' belongings shall be of a type that will permit good housekeeping and maintaining in a sanitary condition. The general types of equipment shall conform to the following rules:

(a) *Clothes Racks.* If clothes racks are provided there shall be a shelf at least twelve (12) inches x twelve (12) inches above the racks for lunches, hats, and the like. Clothes shall not be spaced so close that there is no chance for circulation of air, and clothes hangers shall not be spaced closer than six (6) inches apart.

(b) *Lockers.* Where lockers are provided after the approval of this code by the Industrial Commission, no double height lockers shall be installed, and any lockers installed thereafter shall not be less than one hundred and forty-four (144) square inches in cross-sectional area, and not less than sixty (60) inches high outside measurement as measured from the lower edge of the locker base to the lowest edge of the sloping top. The tops of the lockers shall be sloped to prevent the tops from being used for shelf purposes, unless recessed into the wall.

Louvers shall be provided in the top and bottom of the locker door to permit circulation of air through the interior of the locker except that the lower louver may be omitted if air is mechanically forced through the lockers.

The employer shall make periodic inspection of all lockers to maintain them in a sanitary condition.

(c) *Locker Baskets and Other Suspended Devices.* Where locker baskets or other suspended devices are provided for the employees' belongings, they shall be installed at sufficient ceiling height so that the clothes hanging in a suspended manner shall not be less than seven (7) feet above the floor.

Such locker baskets and other suspended devices shall be installed in staggered arrangement with spacing of not less than fifteen (15) inches apart on line and eleven (11) inches apart in parallel lines.

*Rule 8. Locker Room Benches:*

Benches or stools shall be provided for not less than fifty (50) per cent of the number of employees using the locker room per shift, except that benches or stools shall not be required if the employees do not have to change clothes before going home.

*Rule 9. Floor Space Required for Employees' Belongings:*

The floor space of any new locker room or any addition to locker rooms provided after the approval of this code by the Industrial Commission, for clothes racks, lockers or locker baskets and other suspended devices plus the stools or benches provided, plus whatever aisle space is necessary for employee to reach the facilities shall not be less than four and five-tenths (4.5) square feet per facility.

*Rule 10. Wash and Locker Room Temperatures:*

The temperature of wash and locker rooms during periods of occupancy shall not be less than 72 degrees F.

## SECTION VIII. REST ROOMS FOR WOMEN

*Rule 1. Rest Room Requirements:*

Every establishment employing more than five (5) women shall provide a rest room and after the approval of this code by the Industrial Commission all new rest rooms shall be located adjacent to and connected by means of a door, with the women's toilet room, except that establishments that have a plant or factory hospital or medical dispensary on the premises equipped with cots or beds, and the total number of women regularly employed per working shift does not exceed five hundred (500), shall not be required to provide such rest room, but any more than five hundred (500) women shall be provided with rest room as hereafter required.

*Rule 2. Floor Space Required:*

No rest room shall contain less than sixty (60) square feet gross floor area and an additional one-and-a-half ( $1\frac{1}{2}$ ) square feet of floor area shall be added for each female over ten (10) in number up to and including one hundred (100). When there are more than one hundred (100) females regularly employed on any one shift, the area of such rest room shall be increased one (1) square foot for each additional female.

*Rule 3. Furniture Required:*

One (1) cot, couch or bed shall be provided when one hundred (100) females or less are regularly employed per shift. When over one hundred (100) females are regularly employed per shift, cots, couches, or beds shall be provided on the basis of one (1) for each additional two hundred (200) females or fraction thereof.

Chairs or benches shall also be provided.

*Rule 4. Construction of Rest Rooms:*

All new rest rooms provided after the approval of this code by the Industrial Commission shall be separate from all other rooms but shall be connected with the women's toilet room by a door. They shall be constructed in the same manner as provided for in Section VI, Rule 3, (a) and (b).

The floors shall be constructed of or covered with materials impervious to moisture so that they may be kept in a clean and sanitary condition.

*Rule 5. Doors:*

All doors for means of ingress and egress shall be provided with an automatic closing device. The doors shall be plainly marked "WOMEN" and such doors shall not be located closer



than six (6) feet to wash, locker and toilet room doors used by males.

*Rule 6. Rest Room Temperature:*

The temperature of rest room during periods of occupancy shall not be less than 72 degrees F.

## SECTION IX—LUNCH ROOMS

*Rule 1. Provisions for Lunching:*

Either lunch rooms shall be provided for or the locker rooms made available for employees to lunch in when employees are not permitted to lunch at their job as specified in Section II, Rule 9.

*Rule 2. Construction of Lunch Rooms:*

Where lunch rooms are provided, the walls shall be built not less than eight (8) feet high and they need not be ceiled only if built within high vaulted areas.

The walls may be provided with glass.

*Rule 3. Equipment:*

Lunch rooms shall be equipped with sufficient chairs or tables and/or benches to accommodate the number of employees regularly required to lunch at one time.

*Rule 4. Temperature of Lunch Rooms:*

The temperature of lunch rooms during periods of occupancy shall not be less than 68 degrees F.

## SECTION 18. HEALTH AND SAFETY ACT

Any person, firm or corporation, or any agent, manager or superintendent of any person, firm or corporation, who for himself or for such person, firm or corporation, after due notice by the Department of Labor or its authorized agent given in accordance with the provisions of this Act, fails or neglects to comply with any rule made pursuant to Section 4 of this Act, violation of which is referred to in said notice, or who obstructs or interferes with any examination or investigation being made by the Department of Labor or any of its authorized agents, shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than twenty-five dollars (\$25.00) and not more than one hundred dollars (\$100.00) for the first offense; and upon conviction of the second or subsequent offense, shall be fined not less than fifty dollars (\$50.00) and not more than two hundred dollars (\$200.00); and in each case shall stand committed until such fine and costs are paid unless otherwise discharged by due process of law.

By virtue of the authority vested in it by the Health and Safety Act of Illinois, approved March 16, 1936, the Industrial Commission hereby issues the following rules:

**PART "G", RULES AND REGULATIONS RELATING TO INDUSTRIAL HOUSEKEEPING AND SANITATION, AND WASH, LOCKER, REST, TOILET, AND LUNCH ROOM REQUIREMENTS.**

Effective September 1, 1944, as provided in Section 8 of the Health and Safety Act.

Said rules consisting of PART "G" as stated above, together with Parts "A" and "B", heretofore promulgated by the Industrial Commission on January 22, 1938, and became effective May 1, 1938, and Part "B" later amended by the Industrial Commission on May 15, 1944 and became effective September 1, 1944 and Part "C", which was promulgated on April 5, 1938, and became effective July 15, 1938, and Part "D", which was promulgated on July 31, 1939, and became effective November 1, 1939, and Part "E", which was promulgated on August 8, 1940 and became effective January 15, 1941, and Part "F", which was promulgated on January 21, 1941, and became effective May 1, 1941, all shall remain in full force and effect until amended or rescinded by rules hereinafter made and published by the Industrial Commission.

Signed at Chicago, Illinois, this 15th day of May, A. D., 1944.

**INDUSTRIAL COMMISSION OF ILLINOIS,**

By: Alfred J. Borah, Chairman;  
William John Granata,  
William E. King,  
John Moulin,  
Elmer Schofield,  
Commissioners





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